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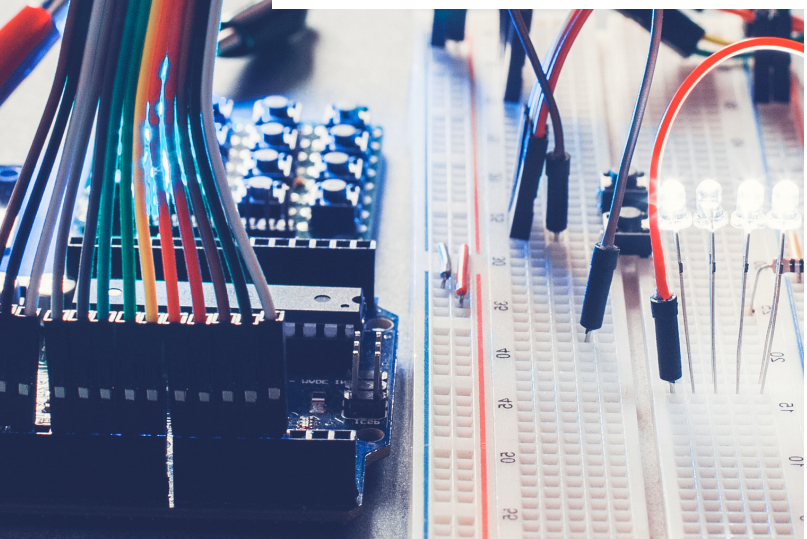

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International Research Journal in Global Engineering and Sciences (IRJGES)
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"SEISMIC RESPONSE OF RCC BUILDING WITH AND WITHOUT DIAPHARM USING STAAD PRO"

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Abstract: The main objective of this project is to analyze and design a RCC framed structure with and without diaphragm for seismic forces. For this analysis we considered a college building [G + 3] (3 dimensional frame). In order to compete in the ever growing competent market it is very important for a structural engineer to save time, as a sequel to this First architectural plan and layout of a college building has been prepared in AUTOCAD and the analysis and design is done by using the software package STAADPRO. In this first the analysis and design is done by applying dead load, live load and floor loads and the results are tabulated. Then again the analysis and design is repeated by applying the panel properties with pressure intensity on the panel and the results are tabulated.The results obtained from the above two steps are compared and are represented graphically.

1. INTRODUCTION

The project is mainly to study the response of a floor (or roof) diaphragm to the horizontal forces generated within it, and how the forces are transmitted horizontally to the building walls and frames.

A horizontal system (roof, floor or other membrane or horizontal bracing) acting to transmit lateral forces to vertical-resisting elements is called as diaphragm.

The floors and roof of a building, in addition to resisting gravity loads, are also generally designed to act as diaphragms. In this respect, they are required both to distribute seismic forces to the main elements of horizontal resistance, such as frames and shear walls, and also to tie the structure together so that it acts as a single entity during an earthquake. The robustness and redundancy of a structure is highly dependent on the performance of the diaphragms. Precast floors without an in-situ topping are not generally recommended in seismic areas.

In a ductile structure, diaphragms will almost always be required to r emain elastic, so that they can sustain their function of transferring forces to the main lateral-resisting structure, and tying the building together. Diaphragms should in principle therefore have the strength to sustain the maximum forces that may be induced in them by the chosen yielding mechanism within the rest of the structure.Eurocode 8 deals with this rather simply by specifying that diaphragms should be designed for 1.3 times the shear forces obtained directly from the analysis.

2. LOAD PARAMETERS

Introduction

Loads and properties of materials constitute the basic parameter of a R.C structures. Both of them are basically of a varying nature .For such a quality of varying nature, it is necessary to arrive of a single representative value. Such value is known as characteristic value. The value to be taken in design which provides appropriate or designed margin of safety is known as design values. The loads are taken as per IS-875 and the material properties like characteristic value are taken from IS-456.

Types of load

The various types of loads acting on the structure which needs consideration in building design as follows:-

dead loads
live loads
wind loads
earthquake loads
other loads

3. MODELING AND ANALYSIS

Structural Planning

Structural planning is first stage in any structural design. It involves the determination of appropriate form of structure, material to be used, the structural system, the layout of its components and the method of analysis.

As the success of any engineering project measured in terms of safety and economy, the emphasis today is being more on economy. Structural planning is the first step towards successful structural design.

Structural Planning of Reinforced Concrete Framed Building

Structural planning of R.C framed building involves determination of:

Column Positions

Positioning of columns

Orientation of columns

BEAM LOCATIONS

SPANNING OF SLABS

LAYOUT AND PLANNING OF STAIRS

TYPE OF FOOTING

Positioning of columns:

Following are some of the guidelines principles for positioning of columns.

Column should be preferably located at or near the corner of the building and at intersection of the walls, because the function of the column is to support beams which are normally placed under walls to support them. The columns, which are near to property line, can be exception from above consideration as the difficulties are encountered in providing footing for such columns.

When center to center distance between the intersection of the walls is large or where there are no cross walls, the spacing between two column is governed by limitations on spans of supported beams because spacing of column beside the span of the beams. As the span of the beam increase as the required depth increase and hence its self weight. On the other hand increase in total load is negligible in case of column due to increase in length. Therefore, column are generally cheaper compared to beams on basis of unit

cost. Therefore, large spans of beam should be avoided for economy reasons.

Orientation of columns:

Column normally provided in the building are rectangular width of the column not less than the width of support for effective load transfer. As far as possible, the width of the column shall not exceed the thickness of the walls to avoid the offsets. Restrictions on the width of the column necessitate the other side (the depth) of the column to be larger the desired load carrying capacity. This leads to the problems of orientation of columns.

BEAM LOCATIONS

Following are some of the guiding principles for the positioning of beams:

Beams shall, normally be provided under the walls and below a every concentrated load to avoid these loads directly coming on slabs. Basic principle in deciding the layout of a component member is that heavy loads should be transferred to the foundation along the shortest path.

Since beams are primarily provided to support slabs, its spacing shall be decided by the maximum spans of slabs which decides the spacing of beams are governed by loading and limiting thickness. The maximum practical thickness for Residential/Office/Public building is 200mm, while minimum is 100mm.

SPANNING OF SLABS

Span of slabs is decided by the position of supporting beams of walls. The slab can be made to span in one-direction (one-way) or two-direction (two-way), depending on support conditions aspect ratio that is Lx/Ly, ratio of reinforcement in the two directions. The designer is free to decide as to whether slab should be designed as one way or two ways.

The points to be considered in making a decision i.e. whether slab should be designed as one way or two ways.

The slab acts as two way slab when $(L_y/L_x) < 2$. A slab acts as one-way when $(L_y/L_x) > 2$

A two-way slab is economical compare to one way slab, because steel along with directions acts as main steel and transfers loads to all the supports, while in one-way slab, main steel is provided along short span only and load is transferred to either of two supports.

Two way is advantageous, essentially for large spans (greater then 3m) and for live loads greater then 3 KN/sq.m. For short spans and light loads steel required for two way slab does not appreciably differ as compare to steel for one way slab because of requirement of main steel.

Model generation :

Working With Autocad :

Here we considered a college building for the analysis. So first we have to collect the requirements of the college and fix the dimensions accordingly and model the building.

An engineering drawing traditionally is prepared using drawing instruments. But accuracy of these drawings is dependent on individual skill of the person drawing them. The modification and repetition work of these drawings are more cumbersome and time consuming. Hence the popular alternative for manually prepared engineering drawings is the computer aided drawing. Computer aided drafting is the process of preparing of an object buildings on the screen of a computer.

Planning for a drawing :

While planning a drawing in AUTOCAD, the following set-up operations are carried out

Fixing of drawing units and limits of the drawing

Basic geometric commands depending upon the requirement

Utilize basic editing commands

File handling commands

Text dimensioning commands

Staad.Pro Input Command File

The STAAD.Pro input command file for our particular G+3 storey building has been shown below:

STAAD SPACE
START JOB INFORMATION
ENGINEER DATE 01-Mar-13
END JOB INFORMATION
INPUT WIDTH 79
UNIT METER KN
JOINT COORDINATES
1 0 0 0; 2 4 0 0; 3 8 0 0; 4 12 0 0; 6 20 0 0; 7 24 0 0; 8 28 0 0; 9 34.9 0 0;
10 38.9 0 0; 11 42.9 0 0; 12 46.9 0 0; 13 50.9 0 0; 14 54.9 0 0; 15 58.9 0 0;

4. DESIGN

Methods Of Design

Structures and structural elements may be designed by any of the following methods:

LIMIT State Method. WORKING STRESS METHOD OF DESIGN

It is earliest modified method of R.C.C structures. In this method structural element is so designed that the stress resulting from the action of services load as computed in linear elastic theory using modular ratio concept do not exceed a pre-designed allowable stress which is kept as some fraction of ultimate stress, to avail a margin of safety. Since this method does not utilize full strength of the material it results in heavy section, the economy aspect cannot be fully utilized in the method.

Ultimate Strength Method Of Design

This method is primarily based on strength concept. In this method the structural element is proportioned to with stand the ultimate load, which is obtained by enhancing the service load of some factor referred to as load factor for giving desired margin of safety. Since this method is based on actual stress strain behavior of the material, of the member as of the structure that too right up to failure, the values calculated by this method agree well the experiment results.

Limit State Method

When a structure or a part of a structure becomes unfit for use, it is said it have reached a limit state unfitness for use can arises in various ways and the aim of limit state design is to provide an acceptable probability that a structure will not reach any of the limit states during its service life. Limit states can be broadly classified into two main categories.

Limit states of collapse which is concerned with the maximum

5. V. RESULTS AND DISCUSSIONS

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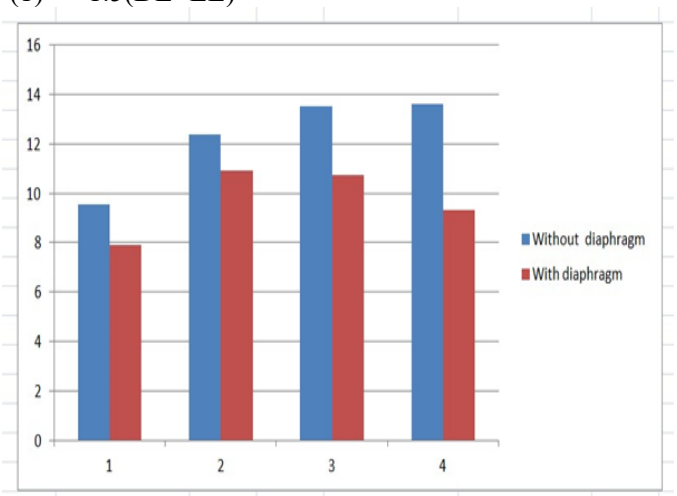

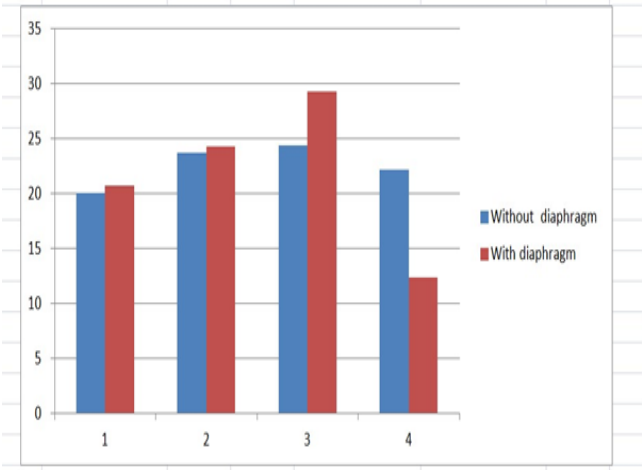

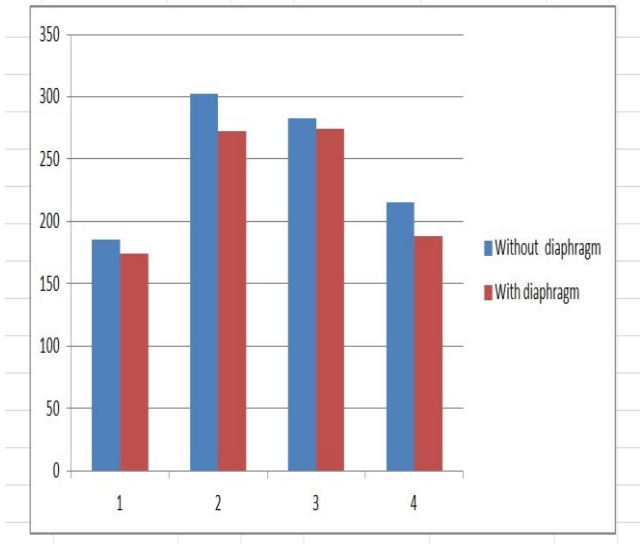

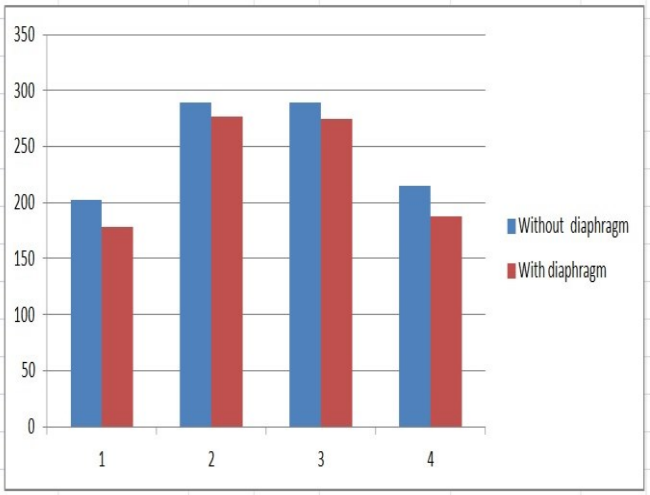

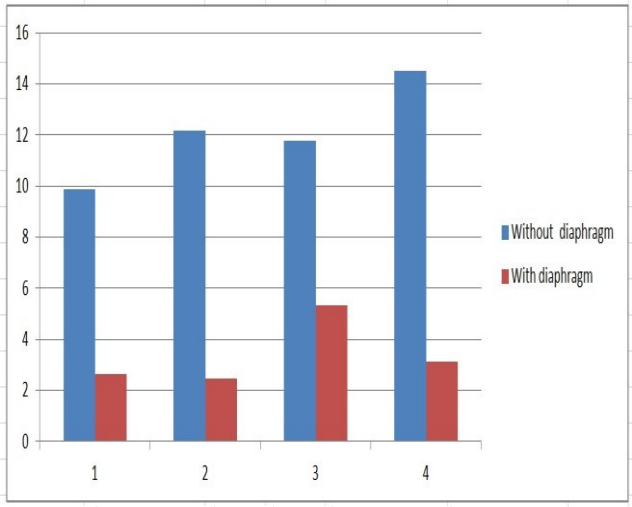

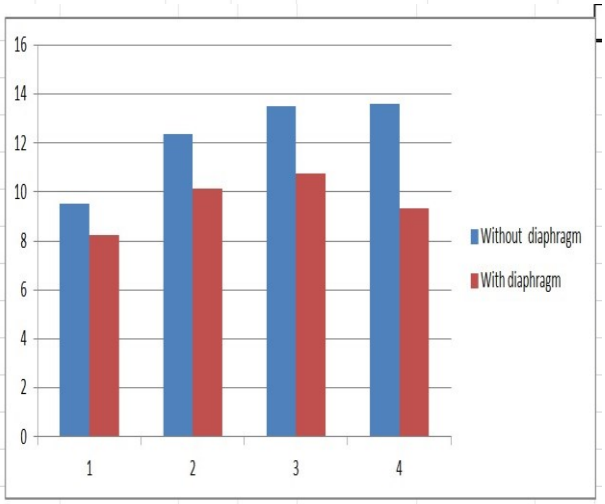

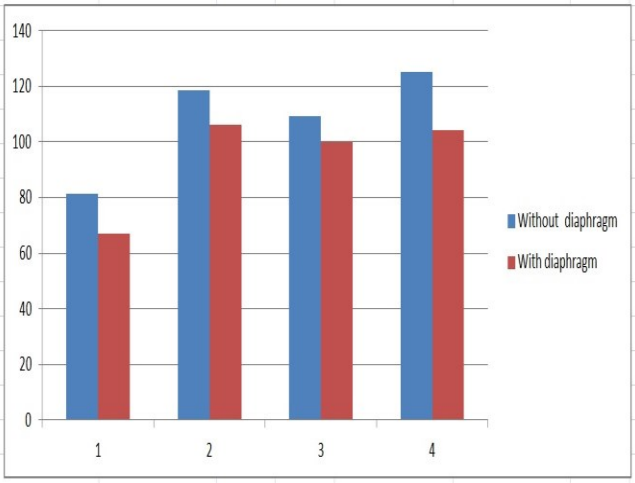

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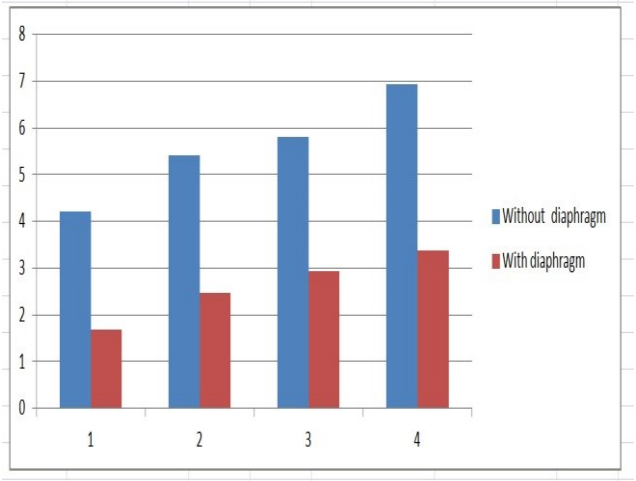

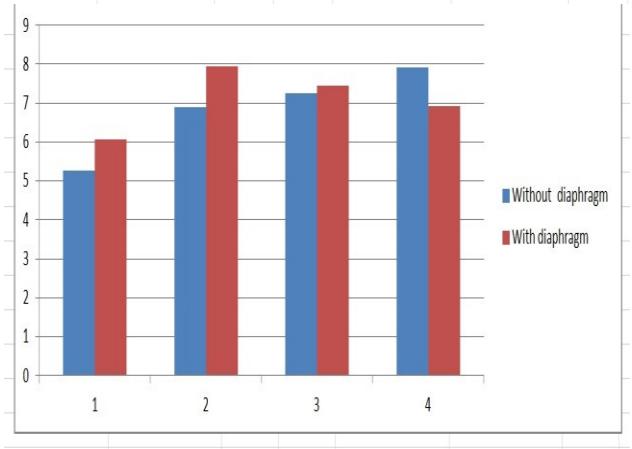

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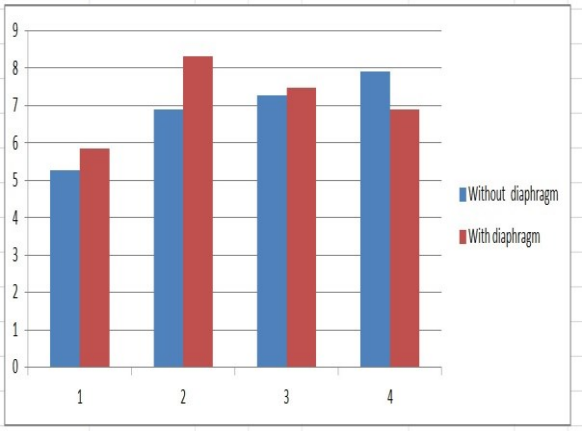
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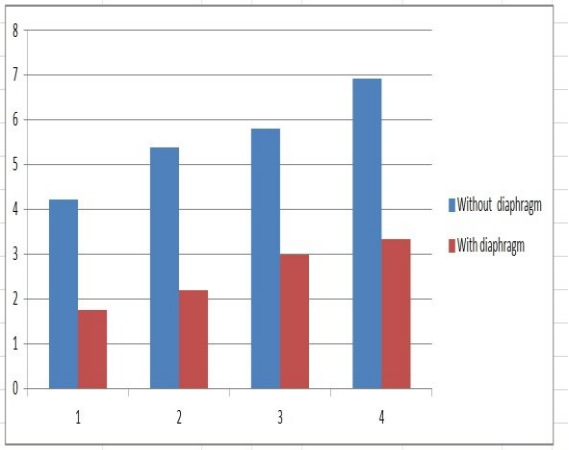
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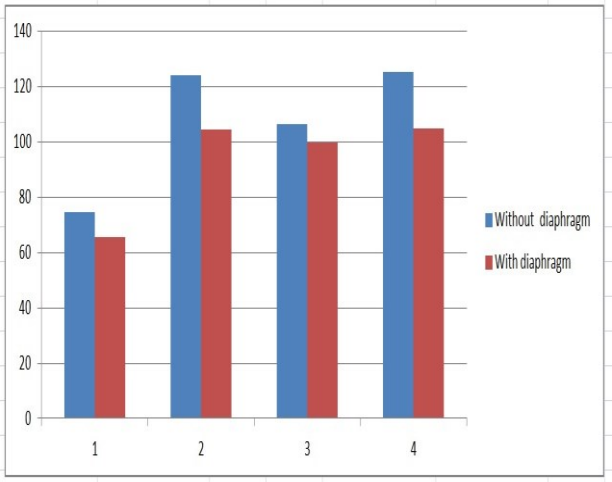
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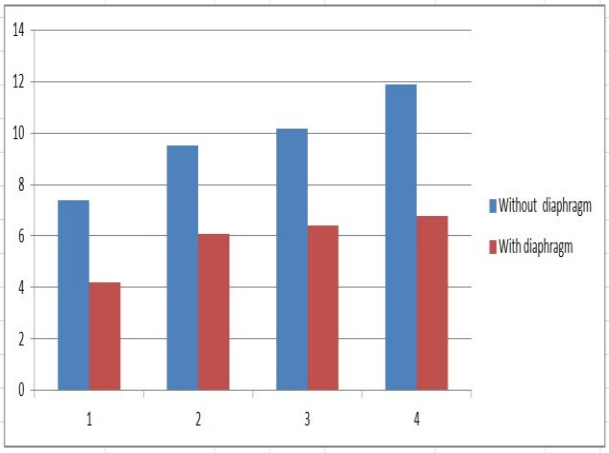
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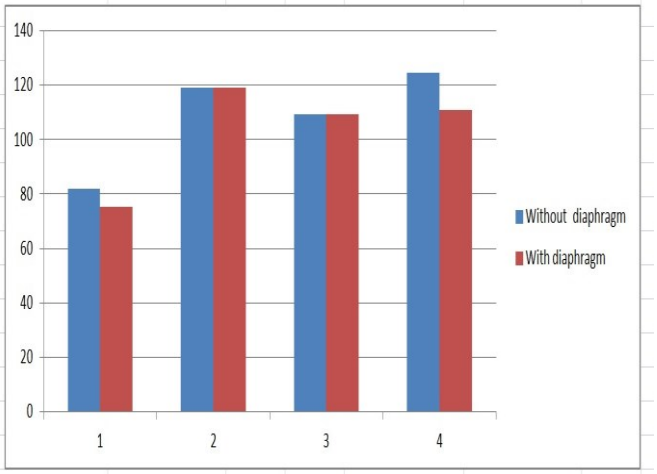
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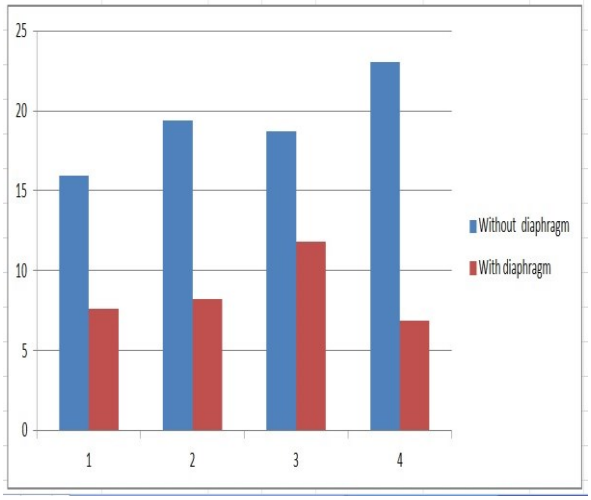
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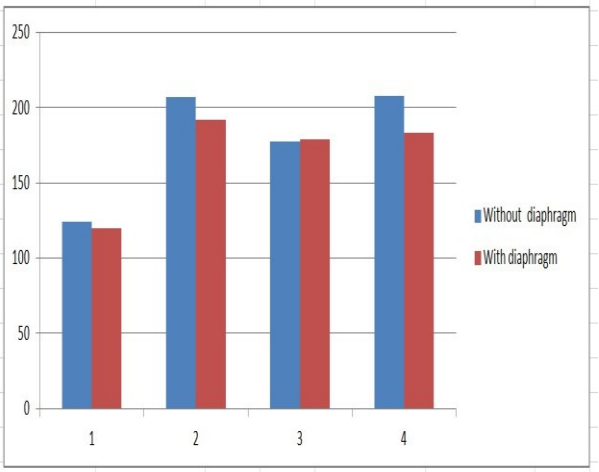
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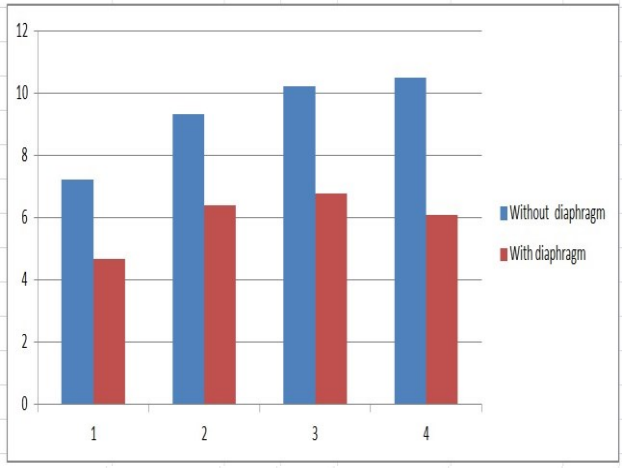
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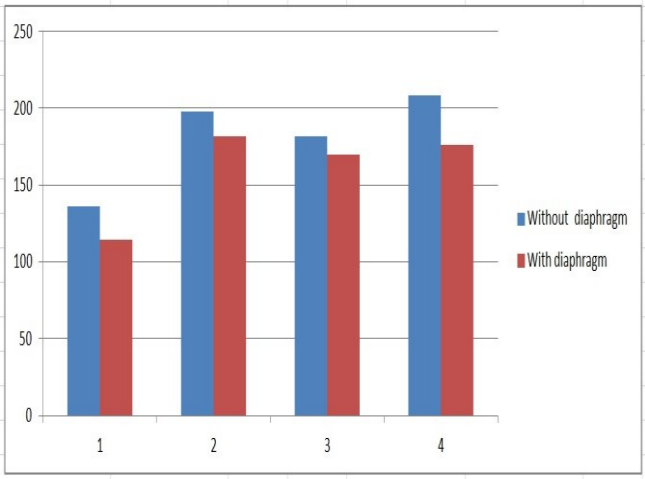
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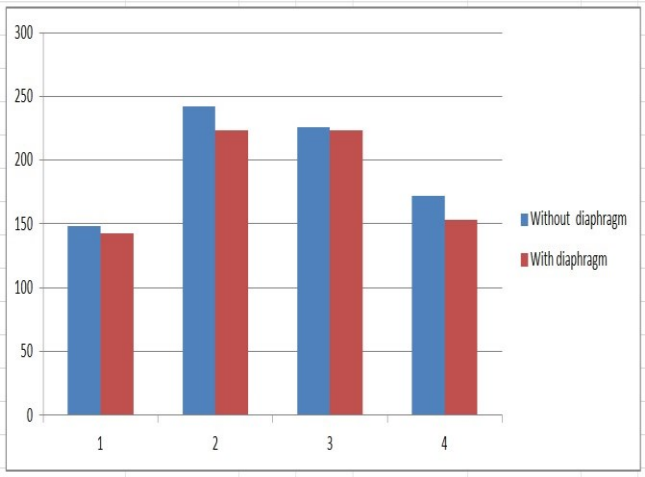
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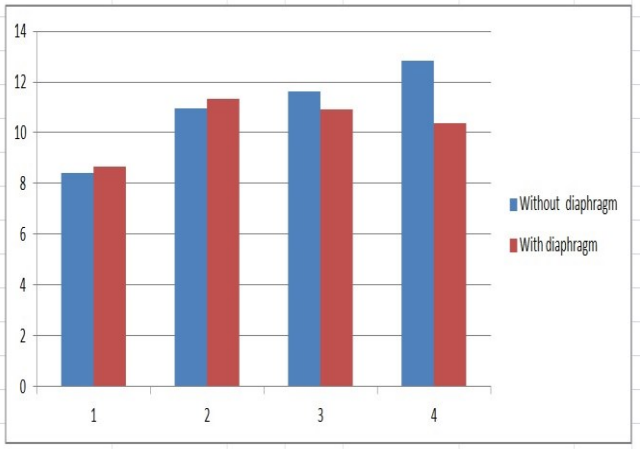
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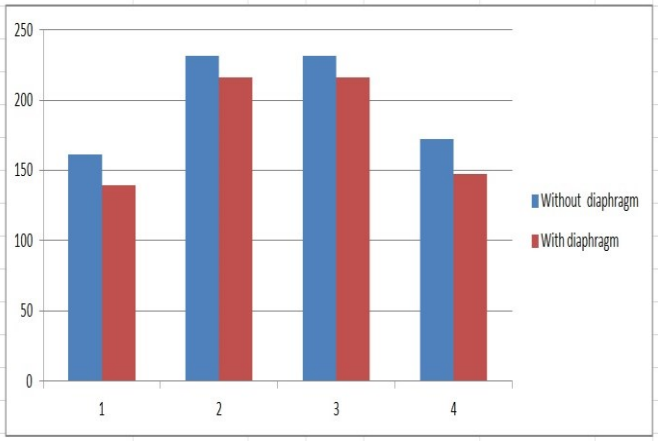
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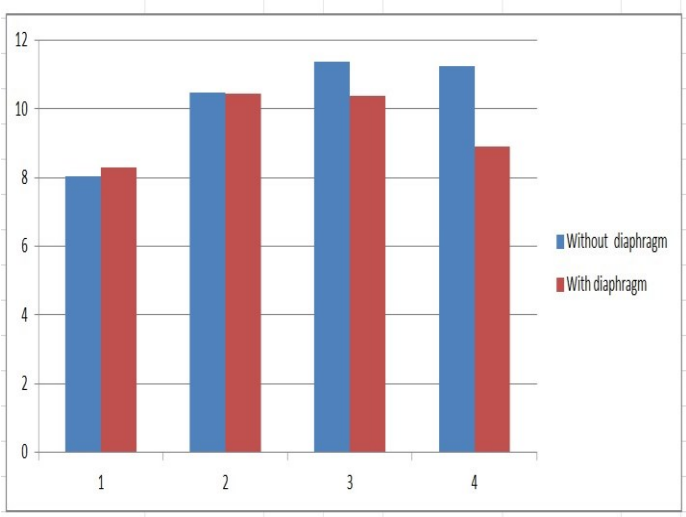

6. CONCLUSIONANDFUTURESCOPE

The project presents a summary of the study of an RCC building with and with out diaphragm.

The graphs above gives the bending moment variation in different columns for different load combinations with and without diaphragms. The results show that when there is a diaphragm the bending moments obtained are more compared to the moments obtained when there is no diaphragm. Also the shear force is more when there is a diaphragm compared to that when there is no diaphragm.

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EFFECT OF FOUDATION SYSTEM FOR DIFFERENT SUPPORTS CONDITIONS IN A R.C.C BUILDING USING STAAD.PRO

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Abstract— The principle objective of this project is to analyze and design a Hospital Building [G + 3 (3 dimensional frame)] using STAAD Pro. In order to compete in the ever growing competent market it is very important for a structural engineer to save time. as a sequel to this an attempt is made to analyze and design a Multi-storeyed building by using a software package staad-pro.
The design involves load calculations manually and analyzing the whole structure by STAAD Pro. The design methods used in STAAD-Pro analysis are Limit State Design conforming to Indian Standard Code of Practice. STAAD-Pro features a state-of-the-art user interface, visualization tools, powerful analysis and design engines with advanced finite element and dynamic analysis capabilities. From model generation, analysis and design to visualization and result verification, STAAD-Pro is the professional‟s choice. Initially we started with the analysis of simple 2 dimensional frames and manually checked the accuracy of the software with our results. The results proved to be very accurate. We analyzed and designed a G + 1 storey building [2-D Frame] initially for all possible load combinations [dead, live, wind and seismic loads].

1. INTRODUCTION

From a long time it has been the constant effort of structural engineers to improve their concepts of analysis and design so that an economical structure is obtained wefwfw3rqconsistent with safety and serviceability. The introduction of various grades of steels helped in achieving considerable economy in the use of scarce minerals and in reducing the cost of construction.

A complete knowledge of the behavior of structures is essential for design and such knowledge as mainly obtained though organized research in laboratories. Ultimately such knowledge finds acceptance in the "codes of practice." Various countries. These research and development programs are very costly to be afforded by any one country. These research developments have become truly international and this is particularly true in the field of "limit state design of R.C.C.Structures."

2. DESIGN PRINCIPLE, ASSUMPTION AND NOTATION ASSUMED

The notation adopted throughout the work is same as in IS-456-2000.

Assumption In Design

1.Using partial safety factors for loads in accordance with clause 36.4 of IS-456-2000 as yf = 1.5

2.Partial safety factor for material in accordance with clause 36.4.2 is IS-456-2000 is taken as 1.5 for concrete and 1,15 for stee

3.Using partial safety factors in accordance with clause 36.4 of IS-456-2000 combination of load.

(D.L. + L.L.) 1.5
(D.L. + L.L. + W.X) 1.5
(D.L. + L.L. - W.X) 1.5
(D.L. + L.L. + Load case 4) 1.5 (D.L. + L.L. - Load case 4) 1.5
0.9 D.L. + 1.5 L.L.
(D.L. + L.L. + W.X) 1.2
(D.L. + L.L. - W.X) 1.2
(D.L. + L.L. + Load case 4) 1.2 (D.L. + L.L. - Load case 4) 1.2

Load calculations

Calculation of DL on beams

self weight of beams = 0.23 * 0.450* 25 = 2.5875 kN/m
Weights due to walls on beam = (2.55 * 0.152 * 19) = 7.3644 kN/m
total = 9.9519 kN/m

Amount of distributed load coming from slab either in the form of triangular load or trapezoidal load = { w Lx (3 – (Lx / Ly) ^2 } / 6 or { w Lx / 3 }
And loads from cantilever slabs ie = w Lx
Here w = self wt of slab , Lx = shorter dimension , Ly= longer dimension of slab panel
Live load on slab:-
This are assumed to be

On floors for hospital buildings = 2.0 kN/sq.m
On terrace =1.5 kN/sq.m
On terrace =3.0 kN/sq.m
Wind load
Design wind speed = Vb * k1 * k2 *k3 (as per clause 5.3)
Here Vb = basic wind speed m/sec
k1 = probability risk factor (from table 1)
k2 = depends terrain height and structure height factor (from table2) k3 = depends on topography (clause 5.3.3.1)

Basic wind speed for Hyderabad region = 44 m/sec (clause 5.2) For all general buildings k1 = 1

Earthquake loads

Base shear = ah * w

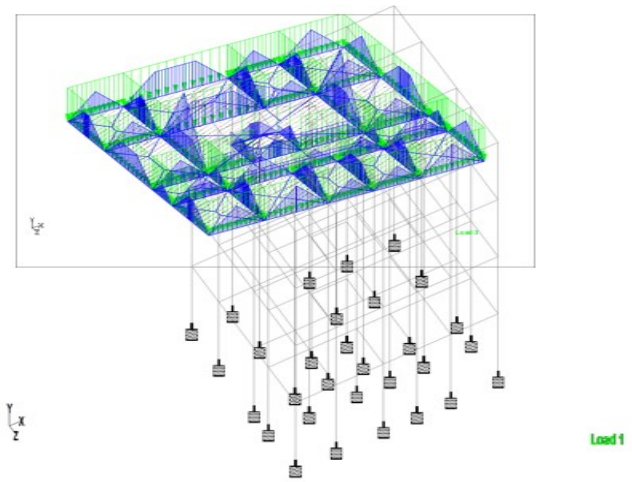
ah = (Z/2) * (I/R) * (Sg/g)

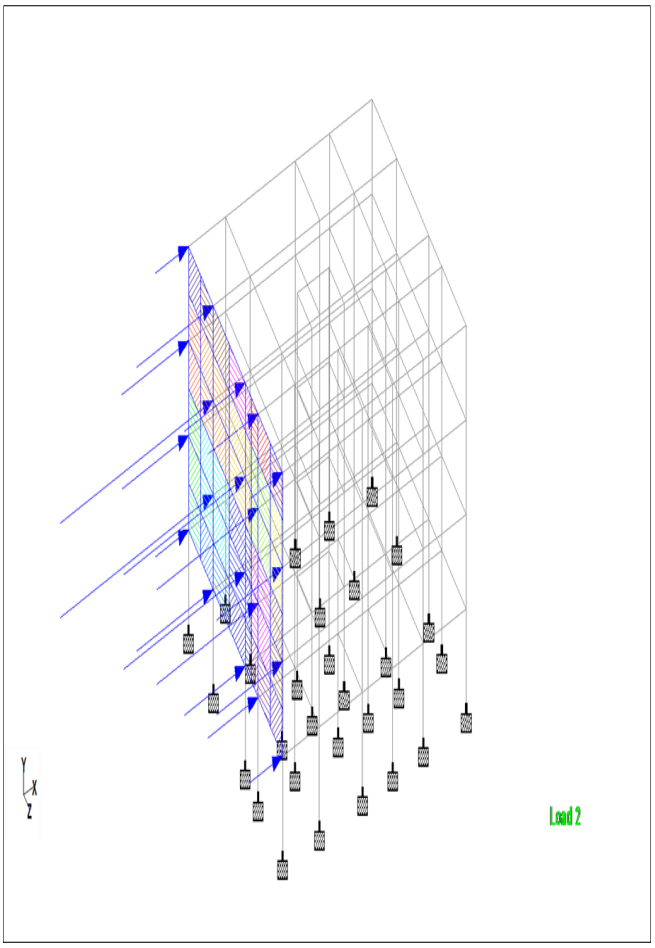
Where ah = Design horizontal acceleration spectrum value Z = Zone factor for MCE conditions
R = Response reduction factor
Sg = Spectrum acceleration depending upon period of vibration and damping g = Acceleration due to gravity.

- Z= zone factor for Hyderabad zone 2 = 0.1
- Importance factor I = 1 for our structure
- Response reduction factor R = 3
- Tx= (0.09*h/ (d^0.5)) Tz = (0.09*h / (d^0.5))

Where, Tx and Tz are time periods (as per IS 1893 clause 7.6.2) h is height of structure
d is dimension of structure in that direction

Dead Loads Shown On Typical Floor





WIND LOADS SHOWN POSITIVE X-DIRECTION
WIND LOADS SHOWN POSITIVE X-DIRECTION
WIND LOADS SHOWN POSITIVE X-DIRECTION

Density Of Materials

MATERIAL	Density
i) Plain concrete	24.0 KN/m3
ii) Reinforced	25.0 KN/m3
iii) Flooring material (c.m)	20.0KN/m3
iv) Brick masonry	19.0KN/m3
v) Fly ash	5.0KN/m3

LIVELOADS: In accordance with IS 875-86

i) Live load on floors	=	3.0KN/m2
ii) Live load on terrace	=	1.50KN/m2
iii Live load on stairs	=	3.0KN/m2

Design Constants

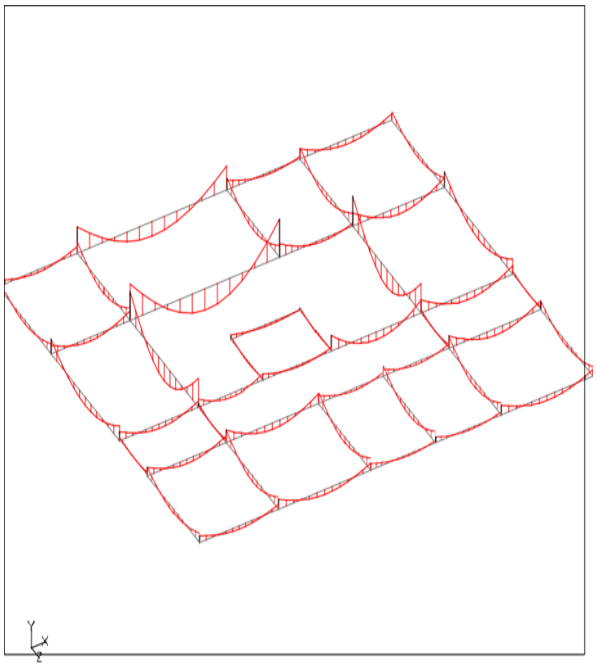
Using M25 and Fe 415 grade of concrete and steel for beams, slabs, footings, columns. Therefore: -
Fck = characteristic strength for M25-25N/mm2
Fy = Characteristic strength of steel – 415N/mm2

Assumption Regarding Design

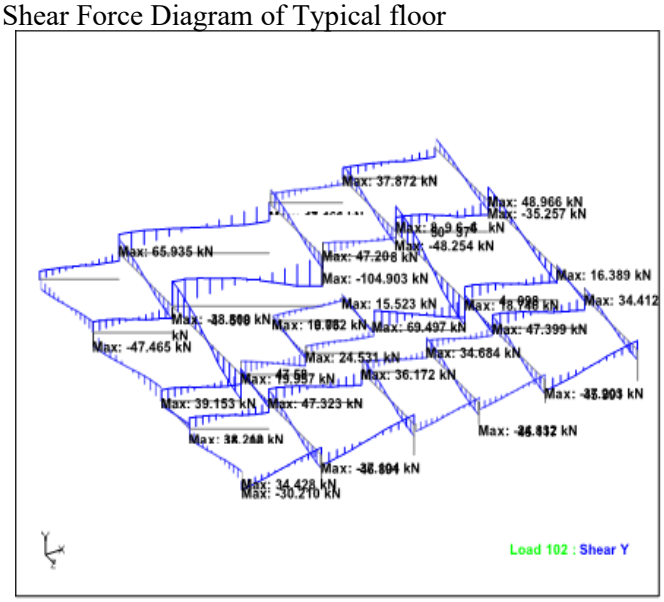
i) Slab is assumed to be continuous over interior support and partially fixed on edges, due to monolithic construction and due to construction of walls over it.
ii) Beams are assumed to be continuous over interior support and they frame into the column at ends
vi) Design of One-way slab S1 Panel
vii) Size = 3.01 □ 1.35 m
viii) Ly □ 3.01 □ 2.23
ix) Lx 1.35
x) □It is a one-way slab.

Cross sectional dimensions:

A) Effective Span (L eff) : Which should be least of the following as per IS456-2000, Pg 34, Clause 22.20, a&b.
i) Leff = Clear span + Effec. Depth
= 1.235 + 0.10
= 1.335 m
ii) Leff = Clear span + SUPPORT.WIDTH/2
=
1.235 + 0.23/2
= 1.35 m
Adopting the least value as (Leff) = 1.335 m
B) Effective Depth (d eff) :
Let us assume the thickness of the slab as per IS456-2000, Pg : 39 , Clause 24.10-2
For Continuous slabs, Leff / D = 32
D = Leff = 1335/2= 41.72mm 100 mm
32
Effective Depth (deff) : 100 -25 = 75 mm
Design loads per m2 of slab
BEAMS
• Analysis Results
Bending Moment Diagram of typical floor



Shear Force Diagram of Typical floor



Graphical Representation

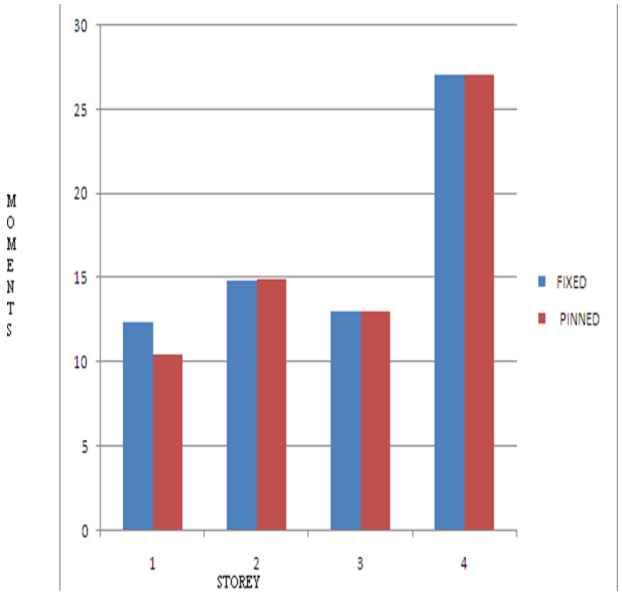


FIG SHOWS THE BENDING MOMENT FOR 1.5(DL+LL)

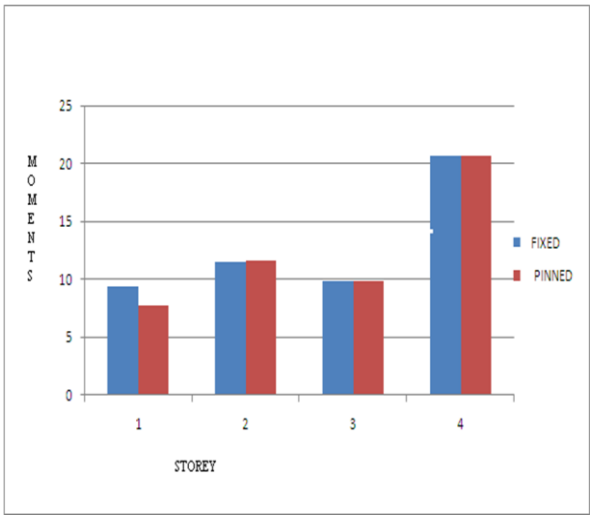


FIG SHOWS THE BENDING MOMENT FOR 1.5(DL+LL)

3. CONCLUSION:

A multistoried (G+3) hospital building is planned to suit the requirements of high standard satisfying the requirements consists of watchmen room, parking area and toilets in ground floor and two flats with two bedrooms each in the respective five floors.

The analysis of the building is done using STAAD- pro software by considering earthquake loads in addition to the dead and live loads as per IS :875 and the results corresponding to the shear forces, bending moments, twisting moments and axial forces have been presented.

The design of various structural elements such as footings, columns, plinth beams, lintel beams, roof beams, slab, stair case etc has been done by limit states method of design as per Is 456-2000. The detailed drawings of the above structural elements have been presented.

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DYNAMIC ANALYSIS OF MULTI STORIED BUILDING (G+6) USING STAAD PRO

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Abstract: Analysis and design of buildings for static forces is a routine affair these days because of availability of affordable computers and specialized programs which can be used for the analysis. On the other hand, dynamic analysis is a time consuming process and requires additional input related to mass of the structure, and an understanding of structural dynamics for interpretation of analytical results. Reinforced concrete (RC) frame buildings are most common type of constructions in urban India, which are subjected to several types of forces during their lifetime, such as static forces due to dead and live loads and dynamic forces due to the wind and earthquake. Here the present works (problem taken) are on a G+30 storied regular building. These buildings have the plan area of 25m x 45m with a storey height 3.6m each and depth of foundation is 2.4 m. & total height of chosen building including depth of foundation is 114 m. The static and dynamic analysis has done on computer with the help of STAAD-Pro software using the parameters for the design as per the IS-1893- 2002-Part-1 for the zones- 2 and 3 and the post processing result obtained has summarized

1. INTRODUCTION

The high-rise building is generally considered as one that is taller than the maximum height which people are willing to walk up, it thus requires mechanical vertical transportation. This includes a rather limited range of building uses, primarily residential apartments, hotels, and office buildings, and also occasionally including education facilities.

As per NATIONAL BUILDING CODE OF INDIA (NBC) 2005, High rise building is defined as a building of 15 metres or greater in height, which is divided at regular intervals into occupiable levels. To be considered a high rise building a structure must be based on solid ground.

It is a common practice to model a multi storied tall building as a frame structure where the load structure design are supported by beams and column.

Intrinsically the structural strength provided by the walls and slabs are neglected as the building height is increasing the effects of lateral load on multi storey and structural increase considerably the consideration of walls and slab in the structural modelling in addition to the frame structure load to improve lateral stiffness those a more economical structural design can be achieved.

In this thesis modelling and structural analysis of multi stored building [G+6] have been performed to investigate the effect considering the walls, slab subjected to dynamic load studied. The structure was subjected to self-weight, dead load, live load, wind load and seismic loads under the load case details of STAAD.Pro. The wind load values were generated by STAAD.Pro considering the given wind intensities at different heights and strictly abiding by the specifications of IS 875 (part 3). Seismic load calculations were done following IS 1893-2000.

The minimum requirements pertaining to the structural safety of buildings are being covered by way of laying down minimum design loads which have to be assumed for dead loads, imposed loads, and other external loads, the structure would be required to bear. Strict conformity to loading standards recommended in this code, it is hoped, will ensure the structural safety of the buildings which are being designed. Structure and structural elements were normally designed by Limit State Method.

The entire process of structural planning and design requires not only imagination and conceptual thinking but also sound knowledge of practical aspects, such as recent design codes and bye-laws, backed up by experience, institution and judgment.

It is emphasized that any structure to be constructed must satisfy the need efficiency for which it is intended and shall be durable for its desired life span.

Structural Design of G +6 Building + Earthquake + Wind Analysis:

The entire process of structural planning and design requires not only imagination and conceptual thinking but also sound knowledge of practical aspects, such as recent design codes and bye-laws, backed up by ample experience, institution and judgment.

It is emphasized that any structure to be constructed must satisfy the need efficiency for which it is intended and shall be durable for its desired life span. Thus, the design of any structure is categorizes into following two main types:-

1. Functional design
2. Structural design

2. FUNCTIONAL DESIGN:

The structure to be constructed should primarily serve the basic purpose for which it is to be used and must have a pleasing look.

The building should provide happy environment inside as well as outside. Therefore, the functional planning of a building must take into account the proper arrangements of

room/halls to satisfy the need of the client, good ventilation, lighting, acoustics, unobstructed view in the case of community halls, cinema theatres, etc.

Structural design:

Once the form of the structure is selected, the structural design process starts. Structural design is an art and science of understanding the behaviour of structural members subjected to loads and designing them with economy and elegance to give a safe, serviceable and durable structure.

The purpose of structural analysis and design is to enable the designer to design the structure with adequate strength, stiffness and stability. The general procedure is as follows

1. Based on space requirements and shape, suitable structural frame works are selected.
2. Based on preliminary analysis and experience approximate dimensions of various structural members are fixed.
3. Detailed analysis is performed to determine the bending moments, shear force, axial forces etc at the required section.

Using the result of analysis the various members are designed ensuring adequate factor of safety (FS).

3. APPLICABLE CODES:

IS 456- 2000:

Plain and Reinforced Concrete - Code of Practice is an Indian Standard code of practice for general structural use of plain and reinforced concrete.

SP 16:

Design Aids for Reinforced concrete to IS 456-2000.

IS 1893(Part 1):

Criteria for earthquake resistant design of structures.

IS 875:

Code of Practice for Design Loads (Other than Earthquake) for Building and Structures. PART 1- DEAD LOADS - UNIT WEIGHTS OF BUILDING MATERIALS

PART 2- IMPOSED LOADS

PART 3 -WIND LOADS

PART 5-SPECIAL LOADS AND LOAD COMBINATIONS.

4. SIGNIFICANCE

According to Code IS: 875 (Part – 3) 1987:

Basic Wind Speed (Vb) :

It gives basic wind speed map of India as applicable to 10 m height above mean ground level for our zone is 44 m/s .

Design Wind Speed (Vz) :

clause 5.2, IS 875(part-3).

The design wind speed at any height can be obtained as :

Vz = Vb. K1. K2 . K3

Where, Vz = design wind speed at any height in m/s.

K1 = Risk Coefficient Factor.

K2 = Terrain , height and structure size factor. K3 = Topography factor.

Risk Coefficient Factor (K1):

Table 1: Risk coefficients for different classes of structures in different wind speed zones [*Clause 5.3.1*]

Class of Structure	Mean Probable design life of structure in years	k_1 factor for Basic Wind Speed (m/s) of					
		33	39	44	47	50	55
All general buildings and structures	50	1.0	1.0	1.0	1.0	1.0	1.0
Temporary sheds, structures such as those used during construction operations (for example, formwork and false work), structures during construction stages, and boundary walls	5	0.82	0.76	0.73	0.71	0.70	0.67
Buildings and structures presenting a low degree of hazard to life and property in the event of failure, such as isolated towers in wooded areas, farm buildings other than residential buildings, etc.	25	0.94	0.92	0.91	0.90	0.90	0.89
Important buildings and structures such as hospitals, communication buildings, towers and power plant structures	100	1.05	1.06	1.07	1.07	1.08	1.08

Terrain , height and structure size factor (K2):

Photograph Indicates of Terrain Category- 2

Features

Terrain - Selection of terrain categories shall be made with due regard to the effect of obstructions which constitute the ground surface roughness. The terrain category used in the design of a structure may vary depending on the direction of wind under consideration.

Wherever sufficient meteorological information is available about the nature of wind direction, the orientation of any building or structure may be suitably planned.

Terrain in which a specific structure stands shall be assessed as being one of the f ollowing terrain categories:

Category 1 - Exposed open terrain with few or no obstructions and in which the average height of any object surrounding the structure is less than 1.5 m.

Category 2 - Open terrain with well scattered obstructions having heights generally between I.5 to10m

Category 3 - Terrain with numerous closely spaced obstructions having the size of building- structures up to 10 m in height with or without a few isolated tall structures.

Category 4 - Terrain with numerous large high closely spaced obstructions.

Our Structure Comes Under Category-2

The buildings/structures are classified into the following three different classes depending upon their size:

Class -A : Structures and/or their components such as cladding, glazing, roofing, etc, having maximum dimension (greatest horizontal or vertical dimension) less than 20 m.

Class -B : Structures and/or their components such as cladding, glazing, roofing, etc, having maximum dimension' (greatest horizontal or vertical dimension) between 20 and 50 m. c1a.U C - Structures and/or their components such as cladding, glazing, roofing, etc, having maximum dimension (greatest horizontal or vertical dimension) greater than 50 m.

Class -C : Structures and their components such as cladding, glazing, roofing, etc, having maximum dimension greater than 50 m.

Our structure comes under class - c

Table 2: k_2 factors to obtain design wind speed variation with height in different terrains *[Clause 5.3.2.2]*

Height (z) (m)	Terrain and height multiplier (k_2)			
	Terrain Category 1	Terrain Category 2	Terrain Category 3	Terrain Category 4
10	1.05	1.00	0.91	0.80
15	1.09	1.05	0.97	0.80
20	1.12	1.07	1.01	0.80
30	1.15	1.12	1.06	0.97
50	1.20	1.17	1.12	1.10
100	1.26	1.24	1.20	1.20
150	1.30	1.28	1.24	1.24
200	1.32	1.30	1.27	1.27
250	1.34	1.32	1.29	1.28
300	1.35	1.34	1.31	1.30
350	1.37	1.36	1.32	1.31
400	1.38	1.37	1.34	1.32
450	1.39	1.38	1.35	1.33
500	1.40	1.39	1.36	1.34

NOTE: For intermediate values of height z and terrain category, use linear interpolation.

Topography (K3) – The basic wind speed V given in Fig. 1 takes account of the general level of site above sea level. This does not allow for local topographic features such as hills, valleys, cliffs, escarpments, or ridges, which can significantly affect the wind speed in their vicinity. The effect of topography is to accelerate wind near the summits of hills or crests of cliffs, escarpments or ridges and decelerate the wind in valleys or near the foot of cliffs, steep escarpments, or ridges.

The K3 value is taken between 1 to 1.36.

Table 3: Fetch and developed height relationship [*Clause 5.3.2.4*]

Fetch (x) (km)	Developed Height h_s (m)			
	Terrain Category 1	Terrain Category 2	Terrain Category 3	Terrain Category 4
(1)	(2)	(3)	(4)	(5)
0.2	12	20	35	60
0.5	20	30	55	95
1	25	45	80	130
2	35	65	110	190
5	60	100	170	300
10	80	140	250	450
20	120	200	350	500
50	180	300	400	500

5. CONCLUSION

STAAD PRO has the capability to calculate the reinforcement needed for any concrete section. The program contains a number of parameters which are designed as per IS: 456(2000). Beams are designed for flexure, shear and torsion.

Design for Flexure:

Maximum sagging (creating tensile stress at the bottom face of the beam) and hogging (creating tensile stress at the top face) moments are calculated for all active load cases at each of the above mentioned sections. Each of these sections are designed to resist both of these critical sagging and hogging moments. Where ever the

rectangular section is inadequate as singly reinforced section, doubly reinforced section is tried.

Design for Shear:

Shear reinforcement is calculated to resist both shear forces and torsional moments. Shear capacity calculation at different sections without the shear reinforcement is based on the actual tensile reinforcement provided by STAAD program. Two-legged stirrups are provided to take care of the balance shear forces acting on these sections.

Beam Design Output:

The default design output of the beam contains flexural and shear reinforcement provided along the length of the beam.

Column Design:

Columns are designed for axial forces and biaxial moments at the ends. All active load cases are tested to calculate reinforcement. The loading which yield maximum reinforcement is called the critical load. Column design is done for square section. Square columns are

designed with reinforcement distributed on each side equally for the sections under biaxial moments and with reinforcement distributed equally in two faces for sections under uni-axial moment. All major criteria for selecting longitudinal and transverse reinforcement as stipulated by IS: 456 have been taken care of in the column design of STAAD

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ANALYSIS AND DESIGN OF BUILDING WITH SHEAR WALL USING STAAD.PRO

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Abstract In present scenario buildings with shear wall is a typical feature in the modern multi-storey construction in urban India. Such features are highly undesirable in building built in seismically active areas. This study highlights the importance of explicitly recognizing the presence of the shear wall in the analysis of building. Design of RCC elements will also be perform as per IS-456 2000 for the building without shear wall. A numerical study will perform using Staad pro Software will be used for 3D multi storey frames with and without shear wall to study the responses of the structure under seismic and wind loads. Storey displacements will be computed for both the buildings with and without shear wall and comparing the results

1.INTRODUCTION

Civil engineer deals with the construction of building such as residential houses, dams, bridges, canals, etc. A simple building can be defined as an enclosed structure with walls and roof. In the early ancient times humans lived in caves, over trees or under trees, to protect themselves from wild animals, rain, sun, etc. as the times passed as humans being started living in huts made of timber branches. The shelters of those old huts have been developed nowadays into beautiful houses. Rich people live in sophisticated condition houses

. Buildings are the important indicator of social progress of the county. Every human has desire to own comfortable homes on an average. Generally, one spends his two-third life times in the houses. This is the reason that the person do supreme effort and spend hard earned saving in owning houses. Nowadays, the house building is major work of the social progress of the county. Daily new techniques are being developed for the construction of houses economically, quickly and fulfilling the requirements of the community engineers and architects do the design work, planning and layout, etc, of the buildings.

A building frame consists of number of bays and stories. A multi-storey, multi-paneled frame is a complicated statically intermediate structure. A design of R.C building of G+5 storey frame work is taken up. The size of building is 40x28m.The number of columns are 33. It is residential complex. The design is made using software on structural analysis design (STAAD-Pro).

The building subjected to both the vertical loads as well as horizontal loads. The vertical load consists of dead load of structural components such as beams, columns, slabs etc and live loads, seismic loads. The horizontal load consists of the wind forces thus building is designed for dead load, live load and wind load as per IS 875. The building is designed as 3 dimensional vertical frame and analyzed for the maximum and minimum bending moments and shear forces by outputs method as per IS 456-2000.With the help of STAAD-Pro software computations of loads, moments and shear forces and obtained.

We have chosen STAAD Pro because of its following advantages easy to user interface

- conformation with the Indian Standard Codes
- versatile nature of solving any type of problem
- Accuracy of the solution

2. STRUCTURAL MODELLING:

The two buildings are modeled and analyzed for static, response spectrum and pushover analyses, using the finite element package SAP2000. The analytical models of the buildings include all components that influence the mass, strength and stiffness. The non-structural elements and components that do not significantly influence the building behavior were not modeled. The floor slabs are assumed to act as diaphragms, which ensure integral action of all the vertical lateral load-resisting elements. Beams and columns were modeled as frame elements with the centre lines joined at nodes. Rigid offsets were provided from the nodes to the faces of the columns or beams. The stiffness for columns and beams were taken as 0.7EIg, accounting for the cracking in the members and the contribution of flanges in the

beams. The weight of the slab was distributed to the surrounding beams as per IS 456: 2000 [4], Clause 24.5

Modeling building structures:

As stated previously, formic a realistic mathematical model that reflects the actual behavior of the structural system is very important in analysis. In engineering practice, Structural analysis of reinforced concrete building is generally performed in the elastic Range. However, in actual cases, the behavior of the structural system may be in the non linear range. This nonlinearity can be approximated and converted to a linear structural behavior by making a series of assumption which simplify the problem significantly .

Methods of Analysis

Method of analysis of statistically indeterminate portal frames:

1. Method of flexibility coefficients.
2. Slope displacements methods(iterative methods)
3. Moment distribution method
4. Kane‟s method
5. cantilever method
6. Portal method
7. Matrix method
8. STAAD Pro

Design of multi storied residential building: General:

A structure can be defined as a body which can resist the applied loads without appreciable deformations. Civil engineering structures are created to serve some specific functions like human habitation ,transportation, bridges ,storage etc. in a safe and economical way. A structure is an assemblage of individual elements like pinned elements (truss elements),beam element ,column, shear wall slab cable or arch. Structural engineering is concerned with the planning, designing and the construction of structures.Structure analysis involves the determination of the forces and displacements of the structures or components of a structure. Design process involves the selection and detailing of the components that make up the structural system. The main object of reinforced concrete design is to achieve a structure that will result in a safe economical solution.

The objective of the design is

1. Foundation design
2. Column design
3. Beam design
4. Slab design
5. Stair case design These all are designed under limit state method

Limit state method:

The object of design based on the limit state concept is to achieve an acceptability that a structure will not become unserviceable in its life time for the use for which it is intended. i.e it will not reach a limit state. In this limit state method all relevant states must be considered in design to ensure a degree of safety and serviceability.

Limit state:

The acceptable limit for the safety and serviceability requirements before failure occurs is called a limit state

Limit state of collapse:

This is corresponds to the maximum load carrying capacity. Violation of collapse limit state implies failures in the source that a clearly defined limit state of structural usefulness has been exceeded. However it does not mean complete collapse. This limit state corresponds to : a) Flexural b) Compression c) Shear d) Torsion

Limit state of survivability:

this state corresponds to development of excessive deformation and is used for checking member in which magnitude of deformations may limit the rise of the structure of its components. a) Deflection b) Cracking c) Vibration

3. PARAMETERS CONSIDERED

4.1 Geometry

1. Length of Building : 26.517 m
2. Width : 16.916 m
3. Height : 36 m
4. No of storeys : 12
5. No of bays in X-direction : 7 no.
6. No of bays in Y-direction : 8 no

4.2 Properties 1. Column size : 0.45 m x 0.50 m, 0.5 x 0.6 m, 0.6 x 0.6 m

2. Beam size : 0.45m x 0.30m, 0.30m x 0.23m
3. Shear Wall Thickness : 150 mm
4. Type of construction : R.C.C framed structure
5. Types of walls : Brick wall
6. Thickness of outer walls : Brick Masonry 230mm thick duly plastered for external walls
7. Thickness of inner walls : Brick Masonry 115mm thick duly plastered for Internal walls
8. Ground floor : 3m
9. Floor to floor height : 3m.
10. Height of plinth : 0.6m from existing ground level
11. Depth of foundation : 1.5 m below ground level
12. Roof covering : RCC Slab
13. Foundation : Open Foundation Isolated RCC Footing
14. Edge / end conditions : Pinned connection framed, Structure slabs are rigidly connected to beams, and Beams are rigidly . Connected to column

4.3 Materials:
1. Concrete grade : M25 for Columns, Beams, Slabs & Footings
2. All steel grades : Fe415 grade
3. Bearing capacity of soil : 400 KN/m²

Plan:

A building frame consists of number of bays and storey. A multi-storey, multi-paneled frame is a complicated statically intermediate structure. A design of R.C building of G+12 storey frame work is taken up. The building in plan (27x17 m) consists of columns built monolithically forming a network. The size of building is 27x18 m. The number of columns is 576. It is residential complex.

The design is made using software on structural analysis & design (staad pro). The building subjected to both the vertical loads as well as horizontal loads. The vertical load consists of dead load of structural components such as beams, columns, slabs etc and live loads. The horizontal load consists of the wind forces thus building is designed as per IS 875: Part: 1 for dead loads, Part 2 for live loads, Part 3 for wind loads. The building is designed as two dimensional vertical frame and analyzed for the maximum and minimum bending moments and shear forces by trial and error methods as per IS 456-2000. The help is taken by software available in institute and the computations of loads, moments and shear forces and obtained from this software.

Loads Considered

Dead loads

As per IS: 875-Part 1

loads from cantilever slabs i.e = WLx

Weights due to walls on beam = (3 x 0.23 x 20) = 13.8 KN/m

Here W = Self wt of slab, Lx = shorter dimension, Ly= longer dimension of slab panel

Calculation of DL on slab

• Self weight of the slab = 0.15 x 25 = 3.75 kN/m²

Floor finish on the slab = 1.0 kN/m²

Total = 4.75 KN/m²

Wall load:

For 230 mm thick 0.23*2.7*19 = 11.89 ≈ 12 KN/m

For 115 mm thick 0.115*2.7*19 = 5.945 = 6 KN/m

Live Loads As per IS: 875-Part 2

Live Load on beams:- This is the live loads of slab which comes on beams in form of triangular or trapezoidal variation

. Live load on slab:- This are loads are to be taken from IS: 875-Part 2 On floors for residential buildings

= 3.0 KN/sq.m On terrace

= 1.05 KN/sq.m On bed rooms,

drawing rooms and toilets = 2.0 KN/sq.m

On kitchen, living rooms and corridors = 3.0 KN/sq.m

Seismic loads As per IS: 1893-2002

Base shear = ah X w ah = (Z/2) X (I/R) X (Sg/g)

Where ah = Design horizontal acceleration spectrum value

Z = Zone factor for MCE conditions

R = Response reduction factor

Sg = Spectrum acceleration depending upon period of vibration and damping

g = Acceleration due to gravity •

Z= zone factor for Hyderabad is zone 2 = 0.1

• Importance factor I = 1 for our structure

• Response reduction factor R = 3

• Tx = [0.09 X h/ (d0.5)] , Tz = [0.09 X h/ (d0.5)]

Where, Px and Pz are time periods (as per IS 1893 clause 7.6.2) „h" is height of structure „d" is dimension of structure in that direction

After calculation we get Px= 0.472 sec, Py= 0.744 sec

We get the value of Sa/g from graph based on time periods

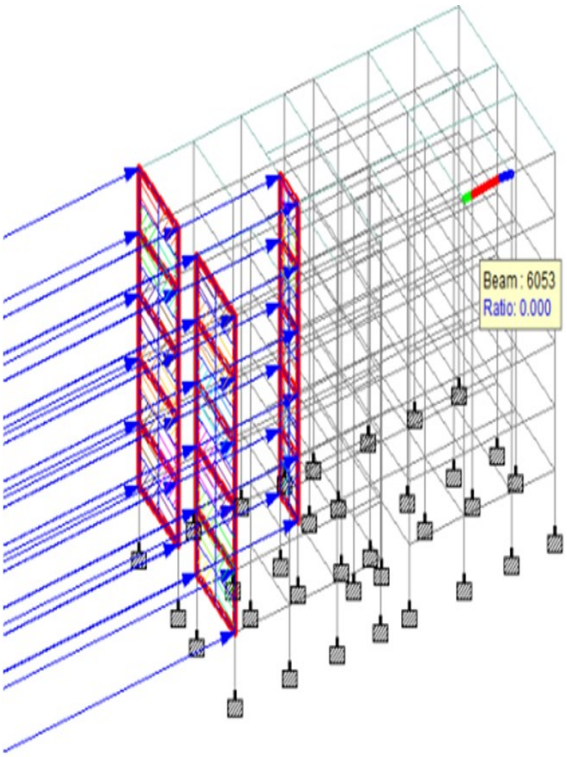
(we get value as 2.5 Finally ah value can be calculated ah = 0.0417

• W= seismic weight

• The seismic weight include the dead weight of the building and reduced live load on the building

• For calculating the design seismic forces of the structure, the imposed loads on roof need not be considered (as per clause 7.3.2 pg 17)

• Damping ratio was taken as 5% Hence seismic weight at each joint are calculated using staad with load combination DL+ 0.5 LL and earth quake loads are applied on the model in staad.



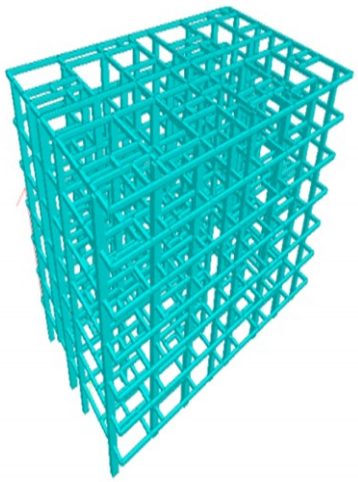
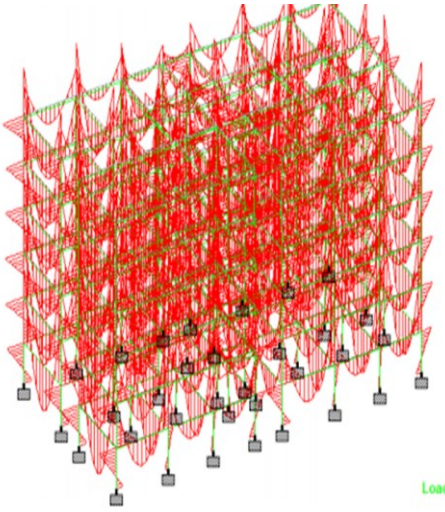


Figure 4.8- Showing 3 D rendering of the structure without shear wall



Load Combinations

4.5.1 Factored Load Combination

1.5(DL+LL)
1.2(DL+LL+EQX)
1.2(DL+LL-EQX)
1.2(DL+LL+EQZ)
1.2(DL+LL-EQZ)
1.2(DL+LL+WX)
1.2(DL+LL-WX)
1.2(DL+LL+WZ)
1.2(DL+LL-WZ)
1.5(DL+EQX)
1.5(DL-EQX)
1.5(DL+EQZ)
1.5(DL-EQZ)
1.5(DL+WX)
1.5(DL-WX)
1.5(DL+WZ)
1.5(DL-WZ)
0.9DL+1.5EQZ
0.9DL-1.5EQZ
0.9DL+1.5WX
0.9DL-1.5WX
0.9DL+1.5WZ
0.9DL-1.5WZ

Size of the footing:

Column load = 1227.6 = P.

Self weight of the footing = 10% of column load. = x10= 122.7

Total load on the soil = 1227.61+122.7 = 1350 KN.
Area of the footing = . = . = 3.37 Provide1.2mx3.05m footing .
so that Area of footing provided = 1.2X2.80 = 3.36m2
2) Upward soil pressure: Factored load P_u = 1.5x1227.61 = 1841.41 KN.
Soil pressure at ultimate load q_u = . q_u = = 548.04KN/m2 = 0.548 N/mm².
Depth of footing from bending moment considerations:
The critical section for bending moment will beat face of column.
M_u = p X . = 1841.41x . = 473.50 kn-m
We know that M_u = 0.138 bd². 437.50X10^6 = 0.138x25x2800xd².
d = 221.39 Provide 300mm effective depth and 350mm overall depth.
Increased depth is taken up to shear consideration.
3)Reinforcement : Mux = 0.87fy Ast d 437.50X10^6 = 0.87x415 x Ast x 300 . 437.50X10^6 = 108315
Ast (1-1.69x10-5Ast) 437.50X10^6 = 108315 Ast - 1.69X10^-5Ast2 4039.14=-5.92x10^-5Ast2 + Ast Ast2 5.92x10^-5-Ast+4039.14
Ast = 6683.76mm2 . Using 20mm bar spacing of bars S =ast x = x202 x = 131 130
Hence ,provide 20mm bars at 130mm c/c. in both direction.
Muy = 0.87fyAstd 122.76x106 = 0.87x415xAstx450 122.76x106 = 162472.5Ast 122.76x106 = 162472.5Ast(1-1.31x10-5Ast) 122.76x106 = 162472.5Ast-1.31x10-5 Ast2 1.31x10-5 Ast2 - Ast+755.20 = 0 Ast = = 762.82mm2 3)
Check for one way shear :
Factored shear for Vu = soil pressure from the shaded area. = qxB . = 0.5481200x . = 656.8(122-d).
Vu= 1.5x(656.8)(1200-d) .
Vu= 985.2(1200-d) = = = (0.25% of steel against M25 concrete) 0.15(1200-d)/d =0.36 180-0.15d=0.36d 180 =(0.36+0.15)d 180=0.51d 180/0.51=d=352.94
D=360mm Percentage of steel. Pt = x122 x = 113.097x . = 0.26% For 0.26% of steel for M25 grade concrete. c = 0.363 N/mm 2 > y Hence it is not safe. for M25 depth of footing to 550mm. Vu = qu L = 0.264x3060 = 0.24x3060x800 = 646272. Tu = = = 0.38N/mm2 . Percentage of steel Pt = x122 x = 113.097x = 0.25% For 0.25% of steel for M25 grade concrete. = 0.36N/mm2 > Hence it is safe with respect to one way shear.
4) Check for 2 way shear:
Perimeter =2(0.4+0.36) =1.52 =1520mm
Shear force =548.04(3.37-(0.4+0.36)^2 =1689.27 KN
D= 1689.27x10^3/1520x1.25 D= 889mm= 900mm Percentage of steel. Pt = x122 x = 113.097x . = 0.26% For 0.26% of steel for M25 grade concrete. c = 0.363 N/mm2 > y
Hence it is not safe. for M25 depth of footing to 550mm.
Vu = qu L
Design of column
Given factored load = Pu = 1557.96 kN
Pu = 0.4fckAc + 0.67fy Ast Let Ast = 1% of steel in a given column Ast = 1/100 of Ag
Ac =99/100 of Ag 1557.96x10^3 =0.4x25x99/100xAg + 0.67x415x1/100
Ast 1557.96x10^3 x10^3 = 12.68 Ag 1557.96x10^3 /12.68 = Ag
Ag = 122.86x10^3mm2 =adopting rectangular column Let b= 300mm
Rectangular area = bxd Bd = x10^3 300xd = 122.86x10^3 d = 122.86x10^3/300 d = 409.53mm = 410mm from above area column section = (300x410)mm
check for slenderness of column :
effective length (le) = 0.65xl = 0.65x3 = 1.95m Le/d = 1.95/0.81 = 2.40m < 12m
The column is to be designed as short column.
Minimum eccentricity (emin) = l/810 + 8410/30 = 3000/410+410/30 =7.31+13.66 =20.97mm
Now emin/d = 20.97/410 = 0.051 < 0.055mm hence the column is axially loaded short column.
Longitudinal reinforcement Ast = 1% of Ag = 1/100 x122.86x10^3 = 1228.6 mm2 Adopt 20mm dia bars of 6 no‟s
Therefore actual Ast = 1884.95mm2
Lateral ties: Lateral ties should not be less than dia/4 = 20/4 = 5mm 5mm Adopt 8mm dia bars.
Spacing of ties:
1)16 of dia = 16x20 = 320mm
2)least lateral dimension of column = 300mm
3)300mm Therefore 8mm dia bars at 300mm c/c
Beam No. 3756 Size of the beam: 300mm X 450mm
Actual moment = 53.446 KN-m
Effective depth = Overall depth – clear cover = 450-20-20/2 =425 mm From SP-16 Table-D for
fy = 415 N/ mm2 & fck = 25 N/ mm2 = 3.45 N/ mm2 = 3.45 X 103 bd2 = 3.45 x 103 x 0.3 x 0.4252 =186.94 KN-m
Actual moment of 53.446 KN-m is less than .
The section is therefore to be designed as a singly reinforced section. (Under reinforced rectangular section)
Calculation of Bending Moments: = = 0.986 From SP-16 Pg-49, Table-3, Pt = 0.732

Check effective depth: Mu = 0.138 fck bd2 53.446 x 106 = 0.138 x 25 x300 x 4252 d = = 227.241mm
Over all depth (D) = 227.241+20 = 247.241 mm
Calculation of area of steel (Ast): Ast = = = 933.3 mm2
Calculation of No. of bars: = = = 3 bars Provide 3 bars of 20 mm @ bottom reinforcement Minimum Shear Reinforcement:

Design of stair case

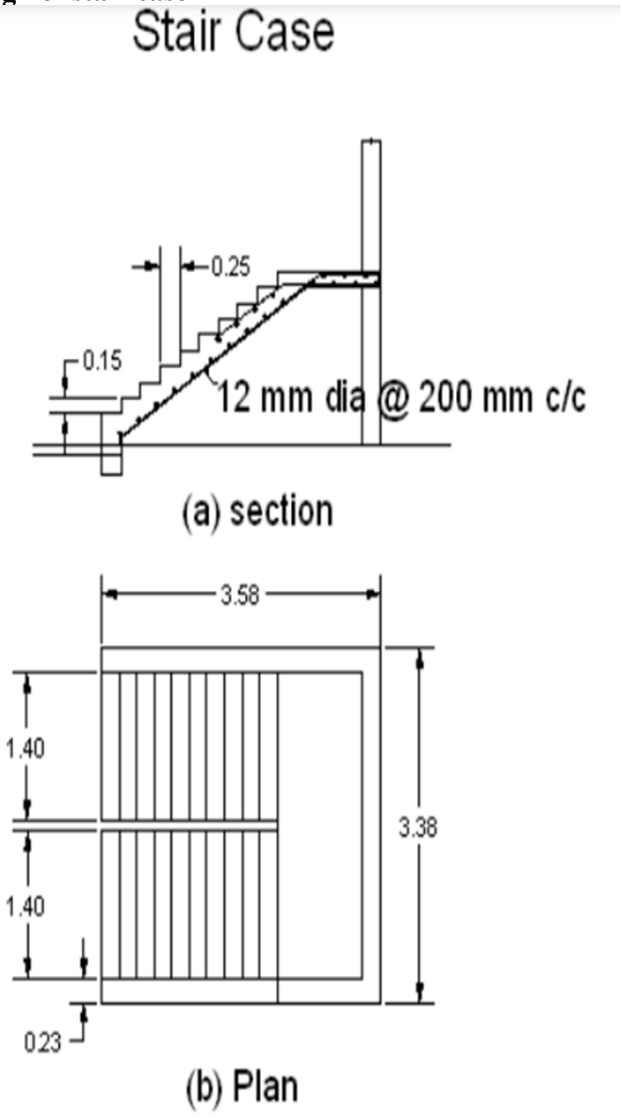


Fig no 5.3 shows plan and section of stair case

Table no 5.8 Two Way slab reinforcement details

Slab	Type	Ly/lx	MUX (Ast)	Spacing	MUY(Ast)	Spacing
S1 S8	Two Way	1.23	444 mm2	170	295	250
S2 S7 S11	Two Way	1.42	430	180	210	300
S3	Two Way	1	235	300	235	300
S4	Two Way	1.80				
S5 S13	Two Way	1.38	240	300	130	300
S6 S12	Two Way	1.55	420	180	165	300
S9	Two Way	1.51	450	170	200	300
S10	Two Way	1.25	350	220	240	300
S14	Two Way	1.15	320	240	250	300
S16	Two Way	1.19	180	300	120	300
S18	Two Way	1.09	300	260	250	300
S20	Two Way	1.42	430	180	210	300
S19 S17	Two Way	1.55	420	180	165	300
S21	Two Way	1.23	444 mm2	170	295	250
S22	Two Way	1.43	440	175	225	300

4. CONCLUSION

Design of RCC Elements as per IS 456 Detailing of Structural elements as per SP-34 The behaviour of multi-storey building with and without shear wall is studied under earthquake excitation. The Seismic coefficient method has been used. A finite element model has been developed to study the behaviour of multi-story frame using Staad Pro software. The results obtained are presented in the form of tables and graphs. The analysis of frame is studied wind and seismic loads. It is concluded that with Seismic, the storey displacements in the building without shear wall are increases as compare to the building Columns with shear wall.

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EXPERIMENTAL INVESTIGATION OF PRESSURE DROP CHARACTERISTICS ACROSS RECTANGULAR CHANNEL USING DETACHED RIBS

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Abstract: In the present day it is very necessary to find heat transfer characteristics of heat exchanger, heat exchanger as an important appliances widely used in day to day life, like in industry, home appliances, gas turbine, transportation, power production, in aircraft etc. the improvement of heat transfer performance of heat exchanger can be done by using insertion of vortex generators across rectangular channel. The experimental study is conducted to examine the pressure drop characteristics across rectangular duct with different geometrical configuration of detached ribs, Detached Ribs as vortex generators are inserted 90˚ in a rectangular duct having different aspect ratio (AR) of 1.4,1.8, 3,3.6. The effect of width, pitch ratio (P/H) of inserting vortex generator, flow direction and aspect ratio of duct are examined for Reynolds numbers (Re) based on hydraulic diameter of rectangular duct Dh, and it is in the range of 8000 to 24000. The results shows if pitch to height increases friction factor ratio decreases by 28.98% , if Reynolds number increases , 8.34% time friction factor ratio increases , if aspect ratio increases friction factor ratio decrease by 80.03%. The experiment is repeated for different AR of vortex generators 1.4,1.8, 3,3.6. pitch ratio (P/h), width 16.07mm, 12.5mm, 7.5mm,6.25mm, for different Re = 8000, 12000, 16000, 20000, 24000.

Keywords: Rectangular Duct, Detached Ribs, Pressure Drop, Vortex Generator, Aspect Ratio, Friction Factor Ratio

1. INTRODUCTION

Heat exchangers are used in almost all the industrial plants, transfer of hot fluid to cold and vice versa , use of heat exchanger is there from olden days to till date and it will be continued, the principle is same from olden days to till today but there are changes in the use of techniques. and in future for better heat transfer enhancement and to improve pressure drop vortex generators as an obstacle in heat exchanger will be used. Most industrial engineers and researchers focus on investigating the heat exchangers because of their wide use in industry, channel flow has got more importance in engineering industry because of their application, the channels may be rectangular, square, triangular, circular, non circular, trapezoid, and polygonal. In this paper, we are using rectangular channel to achieve effective cooling and more compactness, detached ribs are used as vortex generators, the experimental result for detached ribs for different configurations are shown, the influence of pitch to height ratio, aspect ratio of vortex generator for different Reynolds number and pressure are discussed.

K. Yongsiri, p .Eeiamsa-ard, k. wongchare, S. eiamsa-ard (2013): In this paper researcher have taken the incline detached-ribs with different angle of attacks(θ) 0˚, 15˚, 30˚, 45˚, 60˚, 75˚, 105˚, 120˚, 135˚, 150˚, 165˚ with different Reynolds range from 4000 to 24000 for heat transfer, pressure loss, thermal performance and compare with the attached ribs of θ = 90˚. In CFD results at inclined ribs at θ
= 60˚and 120˚ heat transfer, thermal performance factors are high than the other inclined ribs. In flow structure and
temperature field for Reynolds number 4000, inclined detached ribs of angles 45˚, 60˚, 75˚, 90˚, 105˚, 120˚, 135˚ 150˚ create more recirculation zone after the ribs and also at the angles 0˚, 15˚, 30˚ and 165˚ we can't find recirculation zone, result include that medium angle of attack give better mixing of fluid.AmnartBoonloi(2014): Researcher use the 30˚ V-shaped baffles as the vortex generator placed on the double side of the thin with plate and without plate to perform heat transfer and thermal performance in a square duct, here 30˚V-shaped vortex generator are inserted diagonal to the square for different

Reynolds number based on the hydraulic diameter square duct Dh, he find effect of the flow direction (V-Downstream and V-Upstream), pitch ratio, blockage ratio .G.V.Phadtare, Dr.A.A.Pawar, Dr.S.L.Brose, and S.V.channapattana(2013): They used vortex generator of preformatted aluminum plate with thickness 7mm and different dimensions of 3mm X 3mm, 5mm X 5mm, 7mm X 7mm, upstream and downstream for various Reynolds number between 45000 to 80000 with aspect ratio 1. Here they made test section with wooden they examined thermal and hydraulic action were investigate experimentally for the stationary square 180˚ degree bend change. In this experiment they find heat transfer co- efficient of the winglet vortex generator might have 108 times higher than the smooth tip. They examined that if with Reynolds number than Nusselt number also increases for both upstream and downstream. For heat transfer upstream shows good results than downstream for different shapes of vortex generator. Plate 7mm X 7mm vortex generator produces good heat transfer than the other two shapes of

vortex generator. Yinxiozhan, Tae seon park (2012): In this experiment the study is to illustrate the effect of tilt angle of oblique plate for heat transfer and pressure drop for different Reynolds number Re = 200, 600, the tilt angle ranges from 50˚ - 130˚.This experiment is conducted on computational and shows that pressure drop and heat transfer heavily depends in tilt angle and Reynolds number. When the angle near the 90˚-100˚ the wall heat transfer is more. In this experiment the vortex generator is attached to the upper wall of channel through glue and studied by using finite volume method. In steady state the effect of tilt angle for pressure drop and heat transfer is not explicit, but when in unsteady state the tilt angle give affect noticeable on the heat transfer and pressure drop, when tilt angle α=90˚,100˚ it give better mixing of thermal and wall heat transfer

gate valve, we fix the Reynolds number by controlling air through gate valve, the readings in U-tube manometer and then in the micro manometer are noted down. Same procedure is continued for different Reynolds number for different geometrical configuration of vortex generator and the readings are noted down from micro manometer.

2. EXPERIMENTAL SETUP

The experimental model is as shown in fig .1 the test section consists of rectangular duct with dimension 30mm x 30mm x 900 mm. This test section is made up of Acrylic sheet having thickness 8mm, and two pressure taps were fitted for measurement of pressure drop across the test section, to this

W=22mm,
B=16mm C=4mm
W=22mm, B=12.5mm
C=4mm
W=22mm, B=7.5mm
C=4mm

pressure taps micro manometer is connected through the transparent and flexible pipe, Venturimeter and test section are connected through PVC pipe of diameter 30mm, in Venturimeter two pressure taps are connected to U-tube manometer through transparent and flexible pipe. Inside the test section detached ribs as vortex generator are fixed on to bottom surface with adhesive. The distance between two pressure taps is 850 mm and between the pressure taps the vortex generators are fixed, gate valve is connected through PVC pipe to test section and then gate valve to blower is connected by flexible pipe of diameter 32 mm

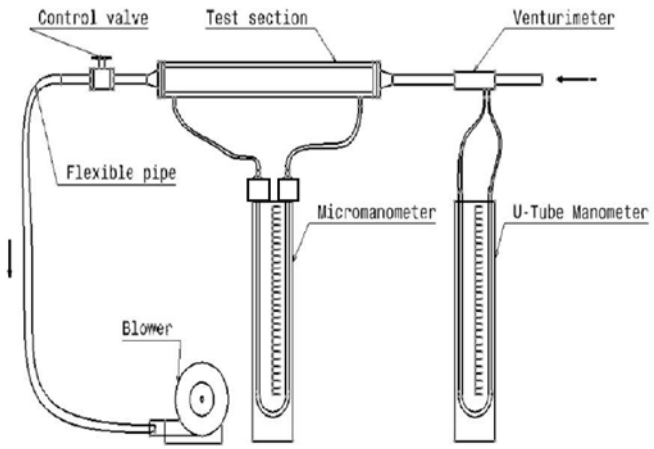

Fig. 1: Experimental setup

In this experiment blower sucks air from atmosphere and that air enters the Venturimeter, when air passes through Venturimeter there will be pressure difference in U-tube manometer and then air passes through the test section causing pressure drop in micro manometer, in this test section pressure drop occur due to friction, surface area. Air passing into Venturimeter and test section is

Fig. 2: Different heights of detached ribs

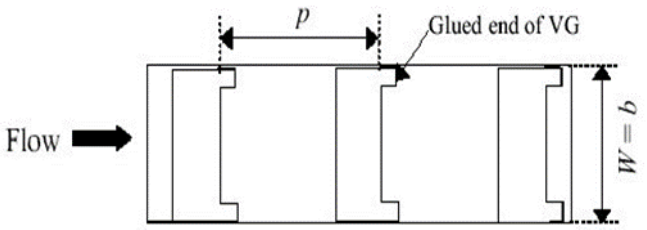

Fig. 3: Arrangement of detached ribs

3. DATA COLLECTION AND ANALYSIS

In the present work

Height of Gap for detachment of ribs from base C = 4mm. Actual discharge (Qact) is calculated: Qact= V/t m³/s

Theoretical discharge (Qth) is given by the formula;

Qth

□ a2 □ a2 m³/s

1 2

The coefficient of discharge is give by the formula:

Cd = Qact/QthReynolds number is given by the formula:

Re = v x□w x d1

□

v = Qact m3 / s Q1

□w = density of water = 1000 Kg/ m³

μ= dynamic viscosity of water 8.9x10-4Ns/m2

A micro manometer is connected across the square duct in order to measure the pressure drop in duct. The pressure is given by

p □ p

□ 2hg□

□ □ □1 □1 □

a □ □ □ a □

x y 2 □1

□

□

□ 2 □

A □ □

□

□ (1)

Actual frictional factor based on pressure drop across the duct is given by

□p

ffa □

4L □v 2

Detachment=4mm

Dh 2

(2)

According to Blasius the friction factor in smooth channel (104<Re<106) for turbulent flow is given by

fft =0.046Re-0.2 (3)

4. RESULT AND DISCUSSION

4.1 Variation of Pitch-To-Height (p/h) with Friction Factor Ratio (f/fs)

Fig.4 to 7 shows variation of pitch on friction factor ratio (f/fs) with different Reynolds number for detached ribs having different Aspect ratio AR = 1.4,1.8, 3,3.6 and different width h = 16,12.5,7.5,6mm in a rectangular channel .If pitch-to-height (p/h) increases than friction factor ratio (f/fs) will decrease as shown in fig 4 to 7 . If small pitch-to-height (p/h) gives smaller axial distance, it means distance between vortex generator are very small for this reason when air passes to obstruction in the channel for this reason we get high friction factor ratio and high pressure drop, due to high friction factor ratio there will be increasing in mixing of flow and also increase in pressure drop. When height of vortex generator increases friction factor ratio value also increases and increase in pressure drop in fig 7. In fig 4 we compare higher friction factor ratio for pitch-to-height 16 and 8, we found that higher value pitch to height at (p/h) 16 is 37.42% time less than the friction factor ratio (f/fs) at lower value pitch to height at (p/h) 4 and from (p/h) 4 to (p/h) 8 friction factor reduces to 0 due to break down of vortices for Reynolds number 24000.In fig 5 we take pitch to height ratio 8 and 16 for Reynolds number 24000, because for p/h = 4 friction factor ratio is out of range for Reynolds number 24000, higher value pitch to height at (p/h) 16 is 41.40% less than the lower value pitch to height at (p/h) 8.In fig 6 we take pitch-to-height ratio12 and 16 for Reynolds number 16000, because for Reynolds number24000 and 20000 and also for pitch-to-height4and 8 is out of range, higher value pitch to height at (p/h) 16 is 32.12% less than the lower value pitch to height at (p/h) 12.

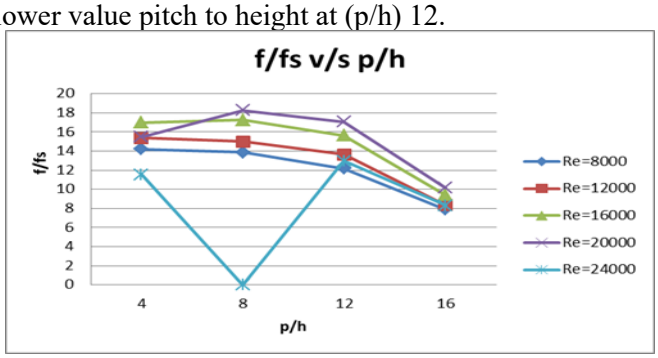

Fig. 4: variation of f/fs with p/h (AR=1.4, h=16mm), Detachment=4mm

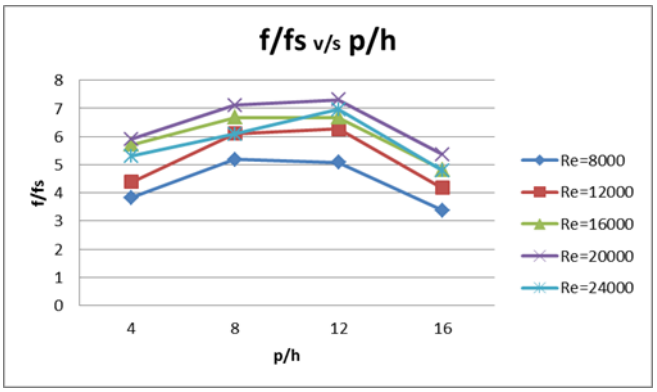

Fig. 5 :Variation of f/fs with p/h (AR=1.8, h=12.5mm), Detachment=4mm

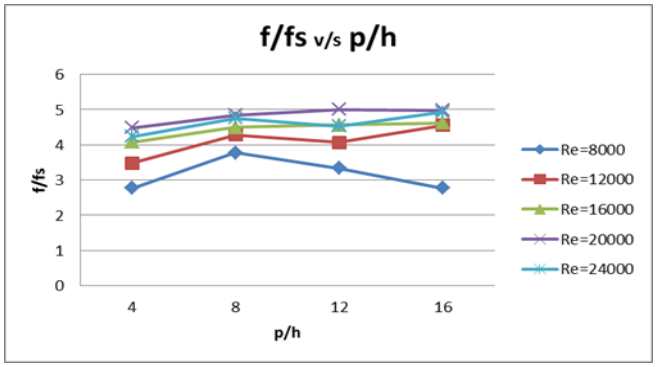

Fig 6: Variation of f/fs with p/h (AR=3, h=7.5mm), Detachment=4mm

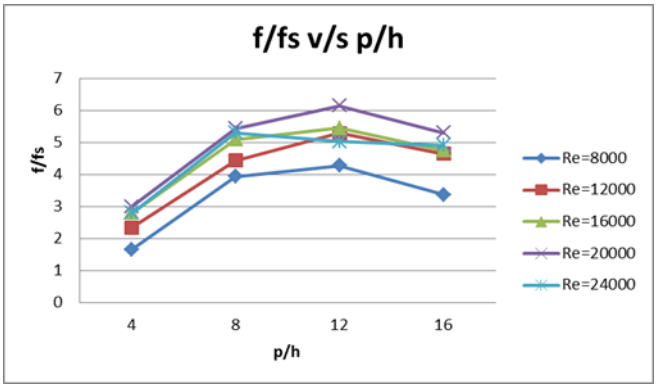

Fig 7: Variation of f/fs with p/h (AR=3.6, h=6mm), Detachment=4mm

4.2 Variation of Reynolds Number (Re) with Friction Factor Ratio (f/fs)

Fig.8 to 11 shows the variation of Reynolds number (Re) with friction factor for pitch to height (p/h) for detached ribs having different aspect ratio (AR) 1.4,1.8,3,3.6 in a rectangular channel. Comparing all the graphs from fig 8 to 11 we can see only small friction factor ratio variation from all graphs. If Reynolds number increases friction factor ratio also increases, if fluid velocity increases than Reynolds number (Re) also increases and automatically friction factor ratio also increases.

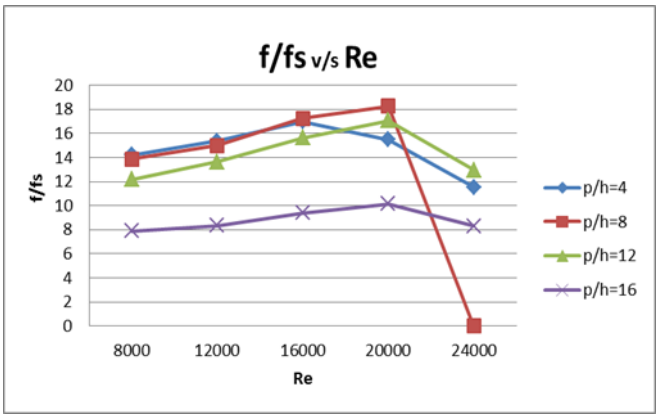

Fig 8: Variation of f/fs with Re (AR=1.4, h=16mm), Detachment=4mm

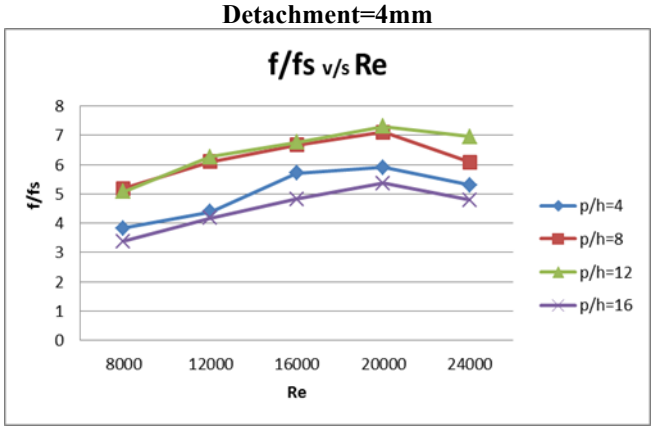

Fig 9: Variation of f/fs with Re (AR=1.8, h=12.5mm), Detachment=4mm

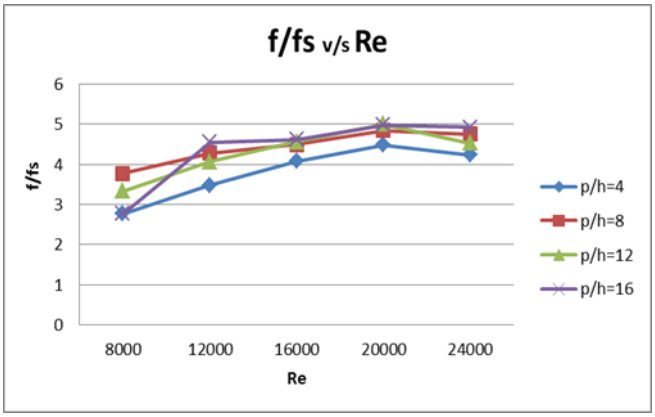

Fig 10: Variation of f/fs with Re (AR=3, h=7.5mm), Detachment=4mm

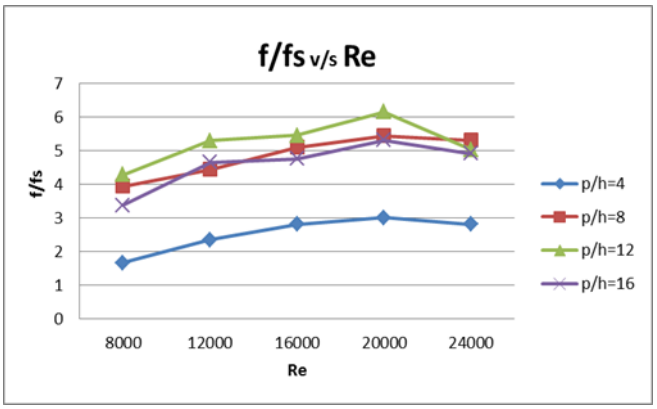

Fig 11: Variation of f/fs with Re (AR=3.6, h=6mm), Detachment=4mm

In fig 8 friction factor ratio for Reynolds number 20000is 7.20% time more than the friction factor ratio for Reynolds number8000 and at Re 20000 to 240000 friction factor reducesdue to break down of vortices for pitch to height (p/h) 4. In fig 9 graph friction factor ratio for Re 24000 is 9.3% time more than the friction factor for Re 8000. In fig

10 graph friction factor ratio for Re 24000 is 8.76% more than the friction factor ratio of Re 8000 for (p/h) 4.In fig 11friction factor ratio for Re24000 is 7.9% more than the friction factor for Re 8000, because if height increase friction factor ratio increase, the vortex generator top face is flat surface not a tip due to flat surface fiction factor will be more friction factor than tip surface.

4.3 Variation of Aspect Ratio (Ar) with Friction Factor Ratio (f/fs)

Fig 12 to 15 shows the variation of friction factor ratio and aspect ratio (AR) for detached ribs with Reynolds number 8000 to 24000 and height h = 16,12.5,7.5,6mm. If aspect ratio (AR) increase friction factor ratio (f/fs) decreases, AR=1.4 has higher value than the remaining AR 1.8,3 and 3.6, because of the height of vortex generator, so when height increases friction factor ratio value also increases, vortex generator top plate is not a tip surface it has flat surface, for flat surface there will be better mixing of air flow in rectangular channel.

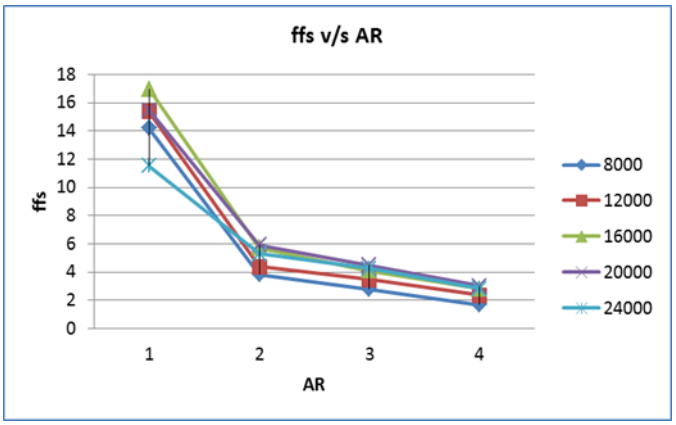

Fig 12: Variation of f/fs with AR (p=4mm), Detachment=4mm

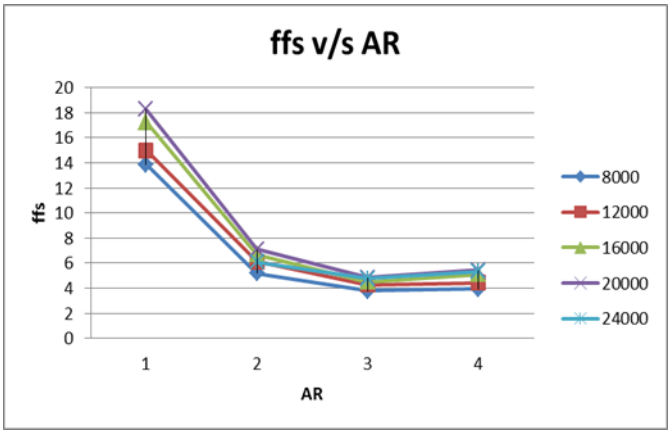

Fig.13: Variation of f/fs with AR (p=8mm), Detachment=4mm

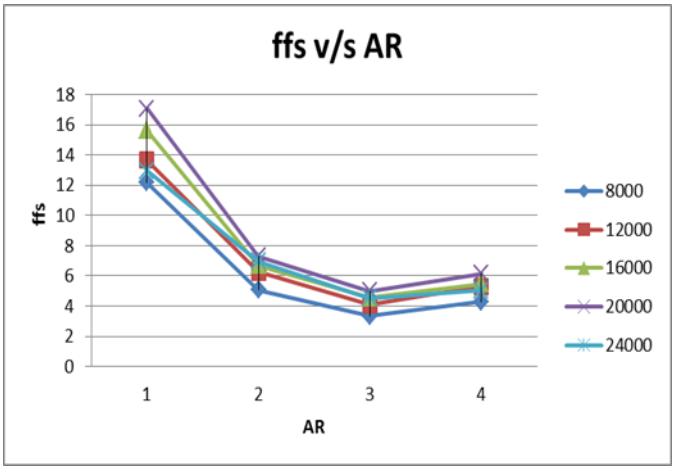

Fig 14: Variation of f/fs on AR (p = 12mm), Detachment=4mm

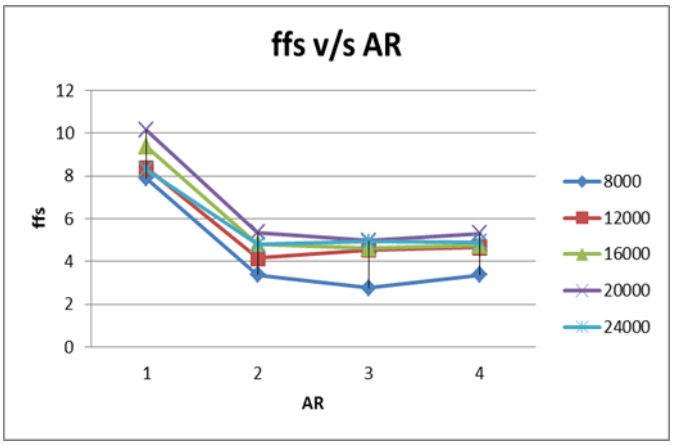

Fig 15: Variation of f/fs on AR (p=16mm), Detachment=4mm

In fig 12 Friction factor ratio (f/fs) for aspect ratio (AR) 1.4 is 45.64% is lower than friction factor ratio (f/fs) for aspect ratio (AR) 3.6, for Re = 16000, because when height of vortex generator increase friction factor ratio will high value. In fig 13 Friction factor ratio (f/fs) for aspect ratio (AR) 1.8 is 57.75% lower than the friction factor ratio for aspect ratio (AR) 3.6for 8000 Reynolds number (Re), if pitch decreases friction factor also decrease because there

will less blockage for that reason there will less mixing of air flow this results less pressure drop . In fig 14 Friction factor ratio for aspect ratio (AR) 3.6 is 80.72% lower than friction factor for aspect ratio (AR) 1.4 for Reynolds number (Re) 8000 and for AR = 1.4. In fig 15 Friction factor ratio for aspect ratio(AR) 3.6 is 85.37% for friction factor ratio for aspect ratio (AR) 1.4.comparing from graphs 12 to15 friction factor value is continuously decreases because pitch value increase , if distance between two adjacent vortex generator is more than there will be less disturbance or less friction in the channel and there will less mixing of air flow due to this there will be less pressure drop.

5. CONCLUSION

The following conclusions can be drawn from this work:

If pitch to height increase then friction factor ratio decrease, if pitch to height increase then friction factor ratio decrease by 28.98%, because if pitch distance between two vortex generators increase their will be less friction or disturbance in the duct.

If Reynolds number increase friction factor ratio also increase because there will be better air mixing flow because of vortex generators, when Reynolds number is low, low velocity of fluid will have low air mixing, when Reynolds number increases, 8.34% time friction factor ratio also increase.

If height of vortex generator increases then friction factor ratio also increases, because it is depended upon dimension of duct and if height of vortex generator is half of duct then there will be greater friction factor ratio and if height of vortex generator is (1/3)rdof duct then there will be lesser friction factor ratio.

If aspect ratio (AR) increases friction factor ratio decreases, when aspect ratio increase then friction factor ratio decreases by 80.03%, because of the height of vortex generator and also the angle of attack, which is placed at 90˚.

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STUDY OF ERECTION SEQUENCE OPERATIONS OF A BOILER IN THERMAL POWER PLANT

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Abstract: This project is mainly about the study of operations that are held during the construction of a boiler. The series of activities that are carried out in a power plant are discussed in this project. By this project we can get an idea of how the current techniques and mechanical operations are used practically. The boiler is a steam generating equipment, the steam thus produced in the boiler was processed further to convert it into a electrical power. The steam processing requires water and coal as a main raw material. The water is circulated inside the tubes and the coal is used as a fuel for burning

1. INTRODUCTION

A boiler or steam generator is a device used to create steam by applying heat energy to water. Although the definitions are somewhat flexible, it can be said that older steam generators were commonly termed boilers and worked at low to medium pressure (7– 2,000 kPa or 1–290 psi) but, at pressures above this, it is more usual to speak of a steam generator.

A boiler or steam generator is used wherever a source of steam is required. The form and size depends on the application: mobile steam engines such as steam locomotives, portable engines and steam-powered road vehicles typically use a smaller boiler that forms an integral part of the vehicle; stationary steam engines, industrial installations and power stations will usually have a larger separate steam generating facility connected to the point-of-use by piping. A notable exception is the steam-powered fireless locomotive, where separately-generated steam is transferred to a receiver (tank) on the locomotive.

Types of generator unit used in coal fired power plants:

The steam generator or boiler is an integral component of a steam engine when considered as a prime mover. However it needs to be treated separately, as to some extent a variety of generator types can be combined with a variety of engine units. A boiler incorporates a firebox or furnace in order to burn the fuel and generate heat.

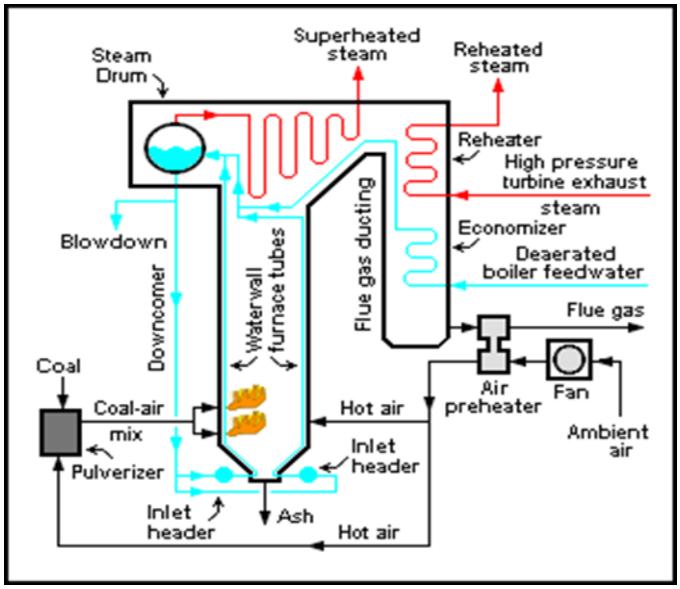


Fig 1.1 steam generator (components of prime mover)

The generated heat is transferred to water to make steam, the process of boiling. This produces saturated steam at a rate which can vary according to the pressure above the boiling water. The higher the furnace temperature, the faster the steam production. The saturated steam thus produced can then either be used immediately to produce power via a turbine and alternator, or else may be further superheated to a higher temperature; this notably reduces suspended water content making a given volume of steam produce more work and creates a greater temperature gradient, which helps reduce the potential to form condensation. Any remaining heat in the combustion gases can then either be evacuated or made to pass through an economiser, the role of which is to warm the feed water before it reaches the boiler.

Types of boiler

Fire-tube boiler

For the first Newcomen engine of 1712, the boiler was little more large brewer's kettle installed beneath the power cylinder. Because the engine's power was derived from the vacuum produced by condensation of the steam, the requirement was for large volumes of steam at very low pressure hardly more than 1 psi (6.9

kPa) The whole boiler was set into brickwork which retained some heat. A voluminous coal fire was lit on a grate beneath the slightly dished pan which gave a very small heating surface; there was therefore a great deal of heat wasted up the chimney. In later models, notably by John Smeaton, heating surface was considerably increased by making the gases heat the boiler sides, passing through a flue. Smeaton further lengthened the path of the gases by means of a spiral labyrinth flue beneath the boiler. These under-fired boilers were used in various forms throughout the 18th Century. Some were of round section (haycock). A longer version on a rectangular plan was developed around 1775 by Boulton and Watt (wagon top boiler). This is what is today known as a three- pass boiler, the fire heating the underside, the gases then passing through a central square- section tubular flue and finally around the boiler sides.

Cylindrical fire-tube boiler

An early proponent of the cylindrical form was the British engineer John Blakey, who proposed his design in 1774. Another early proponent was the American engineer, Oliver Evans, who rightly recognised that the cylindrical form was the best from the point of view of mechanical resistance and towards the end of the 18th Century began to incorporate it into his projects. Probably inspired by the writings on Leupold's "high-pressure" engine scheme that appeared in encyclopedic works from 1725, Evans favoured "strong steam" i.e. non condensing
engines in which the steam pressure alone drove the piston and was then exhausted to atmosphere. The advantage of strong steam as he saw it was that more work could be done by smaller volumes of steam; this enabled all the components to be reduced in size and engines could be adapted to transport and small installations. To this end he developed a long cylindrical wrought iron horizontal boiler into which was incorporated a single fire tube, at one end of which was placed the fire grate. The gas flow was then reversed into a passage or flue beneath the boiler barrel, then divided to return through side flues to join again at the chimney (Columbian engine boiler). Evans incorporated his cylindrical boiler into several engines, both stationary and mobile. Due to space and weight considerations the latter were one-pass exhausting directly from fire tube to chimney. Another proponent of "strong steam" at that time was the Cornishman, Richard Trevithick. His boilers worked at 40–50 psi (276–345 kPa) and were at first of hemispherical then cylindrical form. From 1804 onwards Trevithick produced a small two-pass or return flue boiler for semi-portable and locomotive engines. The Cornish boiler developed around 1812 by Richard Trevithick was both stronger and more efficient than the simple boilers which preceded it. It consisted of a cylindrical water tank around 27 feet (8.2 m) long and 7 feet (2.1 m) in diameter, and had a coal fire grate placed at one end of a single cylindrical tube about three feet wide which passed longitudinally inside the tank. The fire was tended from one end and the hot gases from it travelled along the tube and out of the other end, to be circulated back along flues running along the outside then a third time beneath the boiler barrel before being expelled into a chimney. This was later improved upon by another 3-pass boiler, the Lancashire boiler which had a pair of furnaces in separate tubes side-by-side. This was an important improvement since each furnace could be stoked at different times, allowing one to be cleaned while the other was operating.

Railway locomotive boilers were usually of the 1-pass type, although in early days, 2- pass "return flue" boilers were common, especially with locomotives built by Timothy Hackworth.

Multi-tube boilers

A significant step forward came in France in 1828 when Marc Seguin devised a two- pass boiler of which the second pass was formed by a bundle of multiple tubes. A similar design with natural induction used for marine purposes was the popular Scotch marine boiler.

Prior to the Rainhill trials of 1829 Henry Booth, treasurer of the Liverpool and Manchester Railway suggested to George Stephenson, a scheme for a multi-tube one-pass horizontal boiler made up of two units: a firebox surrounded by water spaces and a boiler barrel
consisting of two telescopic rings inside which were mounted 25 copper tubes; the tube bundle occupied much of the water space in the barrel and vastly improved heat transfer. Old George immediately communicated the scheme to his son Robert and this was the boiler used on Stephenson's Rocket, outright winner of the trial. The design formed the basis for all subsequent Stephensonian-built locomotives, being immediately taken up by other constructors; this pattern of fire-tube boiler has been built ever since.

Superheater

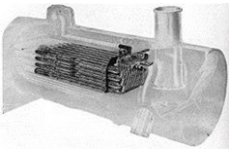


Fig 1.2 superheated boiler on a steam locomotive

L.D. Porta gives the following equation determining the efficiency of a steam locomotive, applicable to steam engines of all kinds: power (kW) = steam Production (kg h−1)/Specific steam consumption (kg/kW h).

A greater quantity of steam can be generated from a given quantity of water by superheating it. As the fire is burning at a much higher temperature than the saturated steam it produces, far more heat can be transferred to the once-formed steam by superheating it and turning the water droplets suspended therein into more steam and greatly reducing water consumption.

The superheater works like coils on an air conditioning unit, however to a different end. The steam piping (with steam flowing through it) is directed through the flue gas path in the boiler furnace. This area typically is between 1,300–1,600 °C (2,372–2,912 °F). Some superheaters are radiant type (absorb heat by thermal radiation), others are convection type (absorb heat via a fluid i.e. gas) and some are a combination of the two. So whether by convection or radiation the extreme heat in the boiler furnace/flue gas path will also heat the superheater steam piping and the steam within as well. While the temperature of the steam in the superheater is raised, the pressure of the steam is not: the turbine or moving pistons offer a
"continuously expanding space" and the pressure remains the same as that of the boiler. The process of superheating steam is most importantly designed to remove all droplets entrained in the steam to prevent damage to the turbine blading and/or associated piping. Superheating the steam expands the volume of steam, which allows a given quantity (by weight) of steam to generate more power.
When the totality of the droplets is eliminated, the steam is said to be in a superheated state. In a Stephensonian firetube locomotive boiler, this entails routing the saturated steam through small diameter pipes suspended inside large diameter firetubes putting them in contact with the hot gases exiting the firebox; the saturated steam flows backwards from the wet header towards the firebox, then forwards again to the dry header. Superheating only began to be generally adopted for locomotives around the year 1900 due to problems of overheating of and lubrication of the moving parts in the cylinders and steam chests. Many firetube boilers heat water until it boils, and then the steam is used at saturation temperature in other words the temperature of the boiling point of water at a given pressure (saturated steam); this still contains a large proportion of water in suspension. Saturated steam can and has been directly used by an engine, but as the suspended water cannot expand and do work and work implies temperature drop, much of the working fluid is wasted along with the fuel expended to produce it.

Water tube boiler

Another way to rapidly produce steam is to feed the water under pressure into a tube or tubes surrounded by the combustion gases. The earliest example of this was developed by Goldsworthy Gurney in the late 1820s for use in steam road carriages. This boiler was ultra-compact and light in weight and this arrangement has since become the norm for marine and stationary applications. The tubes frequently have a large number of bends and sometimes fins to maximize the surface area. This type of boiler is generally preferred in high pressure applications since the high pressure water/steam is contained within narrow pipes which can contain the pressure with a thinner wall. It can however be susceptible to damage by vibration in surface transport appliances. In a cast iron sectional boiler, sometimes called a "pork chop boiler" the water is contained inside cast iron sections. These sections are mechanically assembled on site to create the finished boiler.

Water treatment

Fig 1.5 Large cation/anion ion exchangers used in demineralization of boiler feedwater

Feed water for boilers needs to be as pure as possible with a minimum of suspended
solids and dissolved impurities which cause corrosion, foaming and water carryover. The most common options for demineralization of boiler feedwater are reverse osmosis (RO) and ion exchange (IX).

2. CHAPTER 2 LITERATURE REVIEW

The steam-generating boiler's roots go back to the late 1700s and early 1800s with the development of the kettle-type boiler, which simply boiled water into steam.

The water was placed above a fire box and then boiled into steam. It wasn't until around 1867, with the development of the convection boiler that the steam-generating industry began.
It may be debated who developed the first steam-generating boiler; however, most will agree that George Babcock and Steven Wilcox were two of the founding fathers of the steam- generating boiler. They were the first to patent their boiler design, which used tubes inside a firebrick-walled structure to generate steam, in 1867, and they formed Babcock & Wilcox Company in New York City in 1891. Their first boilers were quite small, used lump coal, fired by hand, and operated at a very low rate of heat input. The solid firebrick walls that formed the enclosure for the unit were necessary because they helped the combustion process by reradiating heat back into the furnace area.

The Stirling Boiler Company, owned by O.C. Barber and named for the street (Stirling Avenue) the facility was on in Barberton, Ohio, also began making boilers in 1891. Their eighth Stirling boiler design was called the H-type boiler ("h" being the eighth letter in the alphabet) and had a brick setting design. The Stirling boiler was much larger than the Babcock & Wilcox boiler and used three drums to help circulate the water and steam flow throughout the boiler.

In 1907, the Stirling Boiler Company merged with the Babcock & Wilcox Company. They renamed their boiler the H-type Stirling, and it became one of best-selling boilers of its time, probably because of its ability to produce up to 50,000 pounds of steam per hour.
However, they were not the only boiler manufacturers during the late 1800s. The Grieve Grate Company and the American Stoker Company were also making boilers of similar all- brick-wall design. They both used a traveling or screw-type grate at the bottom of the boiler to transport the fuel (lump coal) across the inside of the boiler. As the fuel traveled across the inside of the boiler, it was burned and the ash or un-burned fuel would drop into a hopper. These two companies later formed the Combustion Engineering Company in 1912. The new Combustion Engineering Company offered their version of the Grieve and American Stoker boilers and called it the Type E stoker boiler.

The Birth of the Power Industry
With the advent of these new types of boilers and boiler companies, utility companies formed across the country to generate and distribute electricity to the industrial and residential markets. Many cities and towns had their own utility or electric company. Larger cities had numerous utility companies scattered around the city due to the limited amount of steam pressure each boiler and electric generator could produce (on average, approximately 50,000 pounds of steam per hour per boiler). These early utility companies might have as many as 10 to 16 boilers at each facility. Industrial companies that needed a lot of electricity or steam to run their facilities (e.g., Eastman Kodak, which made film and cameras in Rochester, New York, and The Box Board Company—later called the Packaging Corporation of America— which made the boxes for cereal companies in Rittman, Ohio) had their own steam-generating boilers.

By this time there were many more companies manufacturing these tube and tile boilers: Riley Stoker, Foster Wheeler, Erie City, Zurn, Nebraska, Peabody, Keeler, Union Iron Works, and The Trane Company (to name just a few), with the two largest by sales being the Babcock & Wilcox Company and Combustion Engineering. Each had their own unique loose tube wall constructed boiler designs with multiple boiler types depending on the required capacity. To save in engineering costs, each boiler company developed a line of boilers much like the automobile industry did with the Model-T Ford.

For example, Babcock & Wilcox developed their version of the tube and tile boiler starting with their type FF, which was a two-drum boiler capable of producing up to 54,000 pounds per hour of steam. For higher capacities they offered the FH, FJ, FL, and the FP, with the largest design and highest steam capacity (100,000 pounds per hour). The same goes for Combustion Engineering Company, which developed their V2M8 and V2M9 (vertical two drum) super-heater boilers.
The next two most important industry changes occurred in the late 1920s and early 1930s with the introduction of the flat studded tube and the loose tube wall constructed boilers. These two designs allowed the boilers to get the most heat out of burning pulverized coal. The flat studded tube increased heating surface between tubes by adding flat studs all along the tube wall surface. The loose tangent tube design used more tubes close or tangent spaced (touching each other) to increase the heating surface of the tubes. The flat studded tube wall required refractory, insulation, and outer casing to keep the fire inside the fire box, whereas the loose tube

tangential wall design used a smear coat of refractory between the tubes and a steel inner casing over the refractory.

Growth and Specialization

The biggest change in boiler design came with the development of the membrane tube wall in the late 1950s and early 1960s. Seamless tubes were welded together in a tube shop, using a steel membrane bar between the tubes, and made into a large tube panel. This eliminated the need for refractory for keeping the fire inside the fire box, reduced construction cost, shortened erection schedules, and increased the size of the boilers. The radiant boiler designs could now reach up to 4,000,000 pounds of steam per hour. Later the industry developed the largest of the boiler designs, the universal pressure and supercritical boilers. These steam- generating behemoths could now reach over 1,300 megawatts of electricity or 9,000,000 pounds of steam per hour.

During the past 100 years, the steam-generating industry has modified or developed boilers specifically suited for and in response to industry needs. For example, around the late 1940s many medical, industrial, college, and government facilities wanted the ability to generate their own steam and electricity. In response to this need, the package or shop- assembled boilers were developed. A package boiler is a pre-engineered steam-generating boiler that ranges in size and steam capacity (typically from 10,000 to 600,000 lb/hr) built in a shop and shipped by rail or barge. Many companies manufactured these small shop-assembled boilers.

Another example is boilers for the pulp and paper industry, which have been around a very long time and began with the kraft recovery process developed in Danzing, Germany, in 1853. In 1907, the kraft recovery process was introduced in North America. The pulp and paper

industry needed a boiler that could generate large quantities of steam and electricity to help run their driers, help them be energy self-sufficient, and, most importantly, help them make smelt. Using the designs described above, the boiler manufacturers developed the "recovery" boiler.

The recovery boiler's furnace area is designed to melt the sodium salts in black liquor (the byproduct left over from the pulp-making process). Black liquor droplets fall onto the char bed or furnace floor of the boiler, and the molten inorganic chemicals, or smelt, remains on the furnace floor and flows by gravity through the smelt spout openings into a dissolving tank. The smelt will then be recovered by the paper mill for use in pulp processing. Two such designs were Combustion Engineering's chemical recovery boiler, called the V2R (vertical 2 drum recovery boiler), and Babcock & Wilcox's process recovery boiler, called simply a PR boiler.

New Boiler Designs

The steam-generating industry also had to develop new boilers in response to non- commercial or industry demands. By the late 1970s and early 1980s, the growing disposal costs for landfills, the passage of the Public Utility Regulatory Policies Act of 1978, and an increased demand for electric power in the United States led to the development of alternative fuel– burning boilers. Many different types of boilers began to be designed to burn alternative fuels such as refuse (trash), wood, and biomass (vine clippings, leaves, grasses, bamboo, and sugar cane or bagasse). A boiler using fluidized bed technology was also designed as an alternative method of burning solid fuels such as coal. Each alternative fuel–burning boiler has the basic components of its predecessors. The boiler manufacturers only modified the fuel input equipment or modified the basic boiler parts to accommodate the transfer of additional air, ash, or the fuel itself.

3. CHAPTER 3 METHODOLOGY

Erection sequence

1. Supporting structures
   - Preassembly & columns erection
   - Preparation for drum erection
   - Platforms, stair ways & galleries
2. Pressure parts
   - Boiler drum
   - Erection of headers
   - Erection of 1st pass radiant roof
   - Erection of water wall & SH steam cooled wall
   - Down comer erection
   - Erection of coils
   - Buckstay
   - Voids to be closed in pressure parts
   - Hydrostatic test
   - Welding & NDE
   - Air & gas tightness test
   - Furnace alignment & coal burner erection
3. Fine fittings valves & soot blowers
4. Ducts ,dampers & gates
5. Pulverised fuel piping
6. Fuel oil firing system equipment

7. Lining & insulation

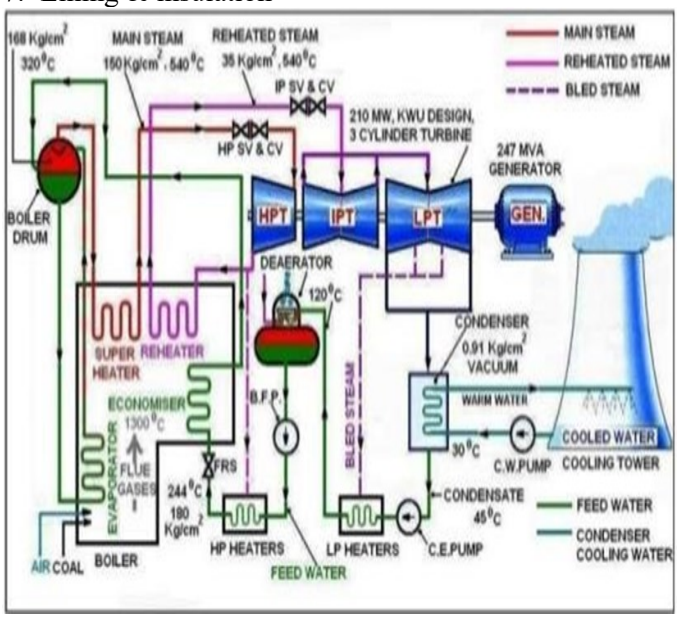


Fig 3.1 schematic diagram of a boiler

Boiler supporting structure forms 25% of the total weight of a steam generator. The entire pressure parts are suspended from the structural steel work. In addition to the above, air preheater load, partial load of ducting and piping are included. Also it forms platforms at various levels for the movement of operator and space for maintenance of various equipments. Hence structural safety and stability are the ultimate objectives of the design. The prime aim of an erector is to meet the design requirements with optimum utilization of men, material and time. To achieve the above, the erector shall adopt all technological improvements that have taken place in the area of structural steel erection. The sequence of structural erection mainly depends on the availability of major handling equipments like tower crane, Crawler crane, etc.

This section describes mainly on boiler supporting structure erection upto drum lifting. However erection activity of supporting structure for airheater, ducts, piping etc., continues, on similar lines, till completion. Refer the applicable FQP for the logsheet formats to be filled and kept as record during structure erection.

Erection sequence with high capacity crawler cranes (FMC & Sumitomo Cranes)

Sumitomo Crane (150T capacity) has capability to lift structural components like columns, bracings etc. whereas FMC Crane (250T capacity) can handle all structural components including ceiling girders.

Crawler crane of 75T capacity may be employed for assembly area, erecting small frames, ladders etc.

i) Piece by piece 'erection of column shall be followed for first two tiers, after completing the necessary quality checks. ii) 3rd and 4th as well as 5th and 6th tier columns can. be pre-assembled and erected, with the help of high capacity cranes.

ii) To facilitate crane movement for column erection, defer the erection of a) rear side second MBL's, 2nd tier of S13 and S14 columns till completion of IIIrd tier of all the other columns. b) Erect balance pieces of column S14 and MBL's only after completion of erection of Girders - A,B,C,D from one end to the other end.

iii) Between S5 and S6 (RHS) 1st tier columns the diagonal bracings can be deferred to facilitate feeding of pressure parts.

Note:

1) Designers clearance to be obtained before the above structural members erection is differed.

2) Any additional temporary bracings to be erected to take care of the structural rigidity.

In case the above cranes are not available concurrently the following sequence can be followed:

1) 955 crane can be deployed upto 2nd ,tier Erection. The crane positioned inside the Boiler and Tier by Tier erection carried out. Between S1 and S2 (left), 85 and S6 (left) the bracings erection can be deferred to bring the Sumitomo crane inside. Similarly between column S6 and S7 (left) the bracings erection can be deferred to take out the Sumitomo crane from Boiler inside after the erection completion of 4th tier.

2) Either front midde (S9 column) or rear middle (S14 column) and middle row columns (S10, S11, S12, S13, S15 L&R and S16 L&R) can be deferred till the crane is brought out of the furnace area.

If the full space is available around the boiler the 8umitomo crane can be kept outside the Boiler. (Generally the availability of space around the boiler is very less since other agencies are also working).

3) Upto the completion of 4th tier the sumitomo crane is used. FMC crane is now located on the rear side of boiler. 5th & 6th tier columns\ are pre assembled and erection can be done starting from front side.

Note: 5th & 6th tier cannot be erected separately since FMC boom will be touching 5th tier when 6th tier erection is being done.

4) Complete the structure erection by pre-assembly assembly of ceiling girders A, B, C, D.

5) The handling equipments manufacturer recommendations are to be strictly followed while lifting the load, especially with respect to:

- Lifting load with respect to boom angle shall be monitored.
- Positioning and the movement of crane shall be only on that consolidated and levelled ground.
- Boom swing speed with load shall be monitored.

Measuring Instruments:

The following measuring and test equipments calibration to be done and made available prior to start of structural erection

Tape 5 M 4 Nos.
30 M 2 Nos
Torque Wrench 650-1000 ft Lbs
Bolt tension calibrator, torque wrench calibrator. Temperature recorder (range 0 to 300°C)
Theodolite - 3 Nos.(1 second accuracy One number for verification and other two for checking column verticality).

In addition to the above piano wire without knots and kinks, plumb bob with oil dash pot and thermal chalks to be made available.

Calibration:

All the instruments are to be calibrated. The calibration Certificate should have cross reference of master calibrator and identify with the National Standards.

3. 2 Furnace alignment and coal burner erection

Service the Tilting Mechanism:

In the absence of coal nozzles in the burner assembly the burner tips are held in position with temporary fixtures. The tilting mechanism, getting damaged in transit is a common phenomena. So the tilting mechanism has to be serviced, replacing all the damaged/broken pins, links etc. and apply lubrication coat.

A. Optical Projection Method

On the burner panel there are angles on to which the burner is mounted. Before welding the burner panel in final position, it is necessary to align the panels with reference. to the final position of burners. Doing the alignment at this time can help to spot shop errors and protect against field errors.

An angle iron is bolted between the two mounting angles. At the midpoint on the channel optical telescope is mounted at a precise 900 to the centre line of the angle iron.

If properly set up, the telescope will form the same angle with the waterwalls as the burner will, when installed. The line of sight will pass through, the working point in front of the burner.

By using this work point and the known dimensions of the furnace the point intersected by the optical line can be calculated. After mounting the burner, a further check can be done sighting through a coal nozzle using the same sighting point on the wall.

Note:

Before the first alignment is done, several preliminaries must be completed. The side, front and rear wall must be at final position. The corner panel must be firmly held in the proposed positions in such a manner that it can be finalized without movement if alignment is correct. Tack weld the panel to panel or use guide bar.

4. CHAPTER 4 RESULT AND ANALYSIS

Calculation Sheet

(For optical Projection Method)

AB = 15240 (as per drawing)
A1E = 15240 - 316 = 14924
EF = Tan 31° x A1E = 0.6009 x 14924 = 9967.83
BF = BE + EF = 9967.83 + 316 = 10283.83
FC = 11506 - 10283.83 = 1222.17
BC = 11506 (as per drawing)
B1G = 11506 - 316 =, 11190
GH = Tan 47° x B1G
1.0724 x 11190 = 12000.16
CH = 12000.16 + 316 = 12316.16
HD = 15240 - 12316.16 = 2923.84

*All dimensions in mm

Calculation Sheet

(For Piano Wire Method)

Distance AB = (15240) – 316 = 7304
2
Distance OB = (15506) – 316 = 5437
2
Distance OA = /OB2 + AB2 = /5437² + 7304² = 9105.459
πOAB = Tan of OB = Tan 5437 = 36° 40’
AB 7304
πOAC = πOAB - πCAB = 36° 40’ – 31° = 5° 40’
Distance OC1 = Sin 5° 40’ x OA = 0.09868 x 9105.495 = 898.5 mm
Diameter of = 2 x 898.5 = 1797.0
fire ball
DistanceAB1 = Tan 47° x 10874 = 1.0724 x 10874 = 11661.277
Distance OX = /xy² + oy² = /5437² + 7304²= 9105.459
Π OXY = Tan oy/xy = Tan 7304 / 5437 = 53°20
π OXZ1 = πOXY - πZ1XYB = 53° 20’ – 47° = 6° 20’
Distance OZ 1 = Sin 6° 20’ x OX = 0.11037 x 9105.459=1004.95
Diameter of fire= 2 x 1004.95 = 2009.9 mm

ball
Distance YZ = Tan 47° x 5437 = 1.072 x 5437 = 5724.2 mm
Distance BC = AB x Tan 31° = 7304 x 0.6009 = 4261.0 mm

5. RESULT

The erection of a boiler in sequence was accomplished and the process were observed and studied.

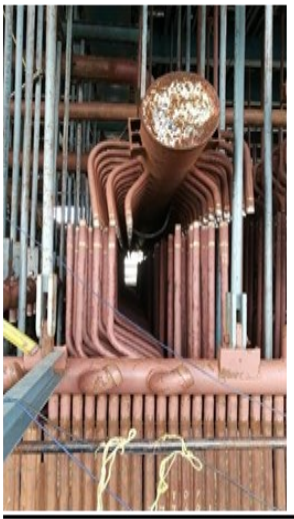
6. CONCLUSION

The Erection sequence operations of a boiler is observed, studied and learned how the equipments, machines, and different operations which we are studying during our course was practically used. Water is considered as a main objective for the steam production, during normal days there will be no problem but during summer and water deficient days major problem occurs in steam production, so in my point of view if the plants were constructed with any other alternative sources for power production along with steam boiler there will be continuous running of the plant.

Pictures taken on site







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CFD ANALYSIS OF SOLAR ABSORBER PLATE

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Abstract: Solar energy is becoming an alternative for the limited fossil fuel resources. One of the simplest and most direct applications of this energy is the conversion of solar radiation into heat, which can be used in water heating systems. A commonly used solar collector is the flat-plate. Solar flat plate collectors are used for domestic and industrial purposes and have the largest commercial application amongst the various solar collectors. This is mainly due to simple design as well as low maintenance cost. A lot of research has been conducted in order to analyze the absorber plate operation and improve its efficiency.

An attempt is being made to analyze the solar absorber plate using the Computational Fluid Dynamics (CFD) so as to simulate the solar absorber plate for better understanding of the heat transfer capabilities of the absorber. In the present work, Fluid flow and heat transfer in the absorber panel are studied by means of Computational Fluid Dynamics (CFD). The conjugate heat transfer phenomenon between absorber and water is modeled using solid works CFD software. The analysis was carried out to investigate the effect of material, mass flow rate, riser position and riser shape. The solar radiation heat transfer is not modeled. The geometric model and fluid domain for CFD analysis is generated using Solid works flow simulation software, Grid generation is accomplished by solid works Meshing Software. The numerical results obtained using the CFD software for copper and aluminum for same boundary conditions has to be analyzed for different design constructions.

Keywords: CFD Analysis, Solar absorber plate, Efficiency, Radiation, Solid Works

1. INTRODUCTION

Solar collectors are key components of active solar-heating systems. They gather the sun's energy, transform its radiation into heat and then transfer that heat to a fluid (usually water or air). The solar thermal energy can be used in solar water-heating systems, solar pool heaters, and solar space-heating systems. The sides and bottom of the collector are insulated to minimize the heat loss. Sunlight passes through the cover and strikes the absorber plate, which then heats up, converting solar energy into heat energy. The heat is transferred to the water passing through the risers attached to the absorber plate. Absorber plates are most commonly painted with "selective coatings" which absorb and trap heat better than any other ordinary black paint. Absorber plates are usually made of metal—typically either copper or aluminum—because both of them are good heat conductors. Copper is the more expensive, but is better when it comes to resistance from corrosion. In locations with an average available solar energy, flat plate collectors are sized approximately at one-half-to one-square foot per gallon of one-day's hot water use.

In order to increase the heat transfer rate of the system, we can make use of different types of augmentation methods. Augmentation methods include active and passive methods with the latter being the most widely used

2. COMPUTATIONAL FLUID DYNAMICS APPROACH

Computational fluid dynamics or CFD is the analysis of systems involving fluid flow, heat transfer and associated phenomena such as chemical reactions by means of computer-based simulation. The technique is very powerful and spans a wide range of industrial and non-industrial application areas. Dynamics of fluids are governed by coupled non-linear partial differential equations, which are derived from the basic physical laws of conservation of mass, momentum, and energy. Analytical solutions of such equations are possible only for very simple flow domains with certain assumptions made about the properties of the fluids involved. For conventional design of equipment, devices, and structures used for controlling fluid flow patterns, designers have to rely upon empirical formulae, rules of thumb, and experimentation. However, there are many inherent problems with these conventional design processes. Empirical formulae and rules of thumb are extremely specific to the problem at hand and are not globally usable because of the non-linearity of the governing equations. For example, a rule of thumb for designing an aircraft wing may not be applicable for designing a wing mounted on a racing car, as the upstream flow conditions are completely different for the two configurations.

The above reasons make experimentation the leading conventional design technique. However, there are many limitations of experimentation techniques as well

A. Measurement of flow variables may cause these variables themselves to change, might not be possible at all (in very small or unreachable spaces), and may be expensive.

B. Experimentation may take a long time to set up, sometimes lasts for a very short time, and may be very expensive, as in the case of supersonic wind-tunnel runs.

C. Experimental data has limited detail.

3. PROBLEM DEFINITION

A lot of research has been conducted in order to analyze the absorber plate operation and improve its efficiency. An attempt is being made to analyze the solar absorber plate using the Computational Fluid Dynamics (CFD) so as to simulate the solar absorber plate for better understanding of the heat transfer capabilities of the absorber. In the present work, Fluid flow and heat transfer in the absorber panel are studied by means of Computational Fluid Dynamics (CFD). The conjugate heat transfer phenomenon between absorber and water is modeled using SOLID WORKS CFD software. By using SOLIDWORKS CFD software solar heat absorber tube made of copper and aluminium are analyzed and compared to each other by passing different working fluids like water. The geometric model is generated in NX-CAD and fluid domain for CFD analysis is generated using, SOLIDWORKS Meshing Software. The numerical results obtained using the CFD software for copper and aluminium for same inlet temperature has to be analyzed.

4. METHODOLOGY

The first objective is to determine the inlet water velocity and corresponding mass flow rate of the absorber plate. Materials, flow rate, pressure drop and all application based inputs must be addressed during this phase. Once operating parameters are complete the goal is to perform a CFD analysis of the solar heat absorber tube to compare results between the solar heat absorber tube made of copper and aluminium and obtain a better understanding of tube operation. Following the computer analysis, alternate forms of heat transfer capabilities will be looked into with emphasis on material and geometry of tubes. The objective is to design a solar heat absorber tube which has a comparable ability to do heat transfer.

A. 3D model of the solar heat absorber tube shall be developed from the 2D drawings using NX-CAD software.

B. The 3D model is imported into Solid Works flow environment to perform the CFD analysis.

C. Conjugate heat transfer analysis shall be done on the solar heat absorber tube made of copper and aluminium in the Solid Works flow simulation environment.

D. Temperature, velocity and Pressure distribution are observed, documented and compared.

E. Design optimization of the solar heat absorber tube shall be done by varying the material and geometry of the tubes.

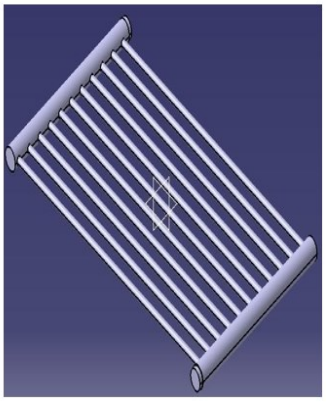
F. Results discussions and comparison of the results by varying the material and geometry of the tubes will be made.

5. PART MODELING OF SOLAR ABSORBER PLATE

A solar absorber plate consists of a material or a selective coating over a material that absorbs the heat from the rays of sun falling on it. The heat from the absorber plate is transferred to the tubes or shells containing the usable water. As a result of convection phenomenon the water gets heated up. The temperature of the water depends on different factors like available day time temperature, efficiency of the absorber plate, arrangement of tubes w.r.t the absorber plate and contact area between the tubes and the absorber plate. The design of the solar absorber plate is made in CATIA v5 and the CFD analysis is made in solid works flow simulation package. The fluid model required for performing the CFD analysis is modeled in CATIA v5

Common outlet section diameter (mm)	56
Common inlet section diameter (mm)	52
Tubes diameter (mm)	22
Tubes length (mm)	1040
Absorber plate thickness (mm)	6
Absorber plate length (mm)	650
Absorber plate width (mm)	980

Table 1: Geometric parameters which are used to design total assembly of solar absorber plate



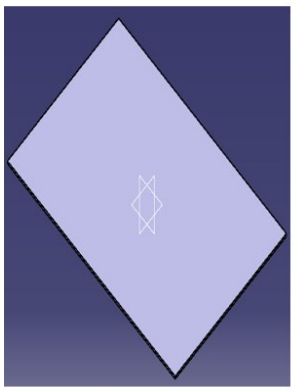


Fig 1 : Fluid model required for the CFD analysis Fig 2 : Represents the absorber plate

6. COMPUTATIONAL FLUID DYNAMIC (CFD) ANALYSIS

To perform Steady State conjugate heat transfer analysis of solar absorber plate to evaluate pressure drop and temperature distribution.Initially the analysis is carried out for two different materials (aluminium and copper).Later the analysis is extended by varying different parameters and comparing for thermal efficiency.

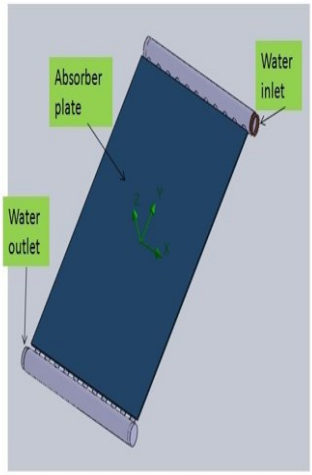


Fig 3: Shows the solar absorber plate with inlet and outlet

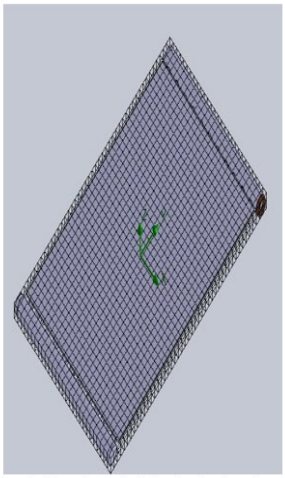


Figure 4 : Shows the mesh of the solar absorber plate

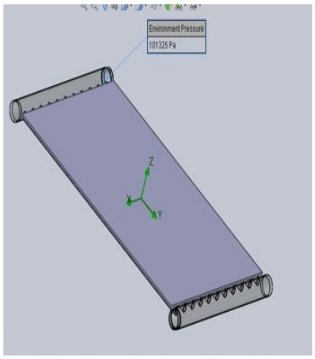


Figure 5 : Mass flow rate Boundary conditions applied

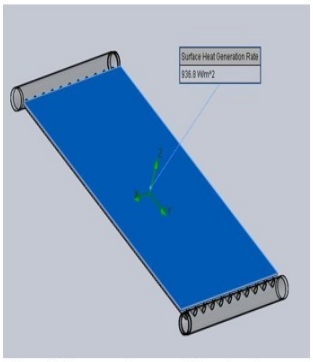


Figure 6 : Heat generation rate applied on the surface source of absorber plate

7. CFD ANALYSIS WITH COPPER MATERIAL

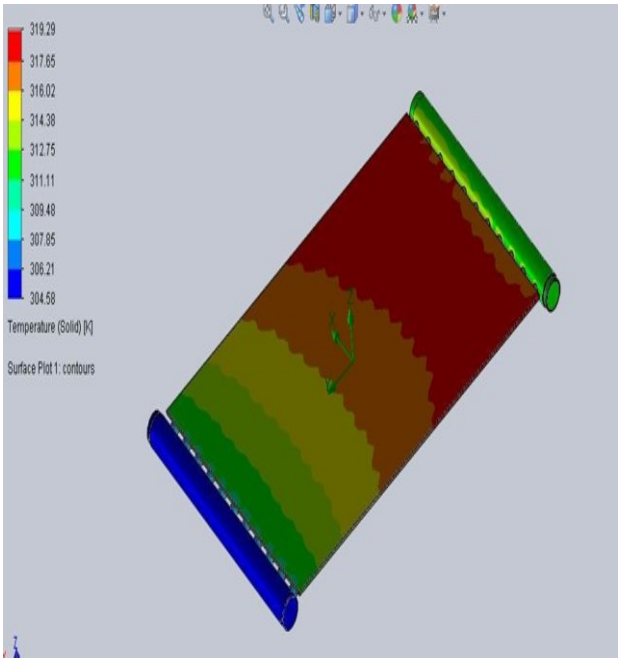


Fig 7: Temperature distribution on the top side of the absorber plate

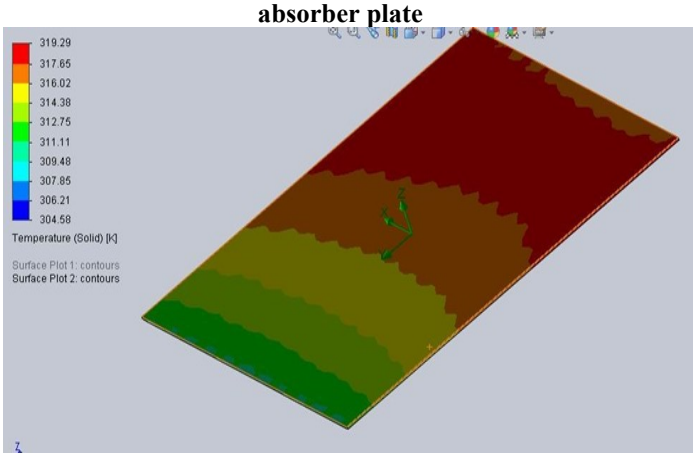


Figure 8 : Temperature distribution on the rear side of the absorber plate

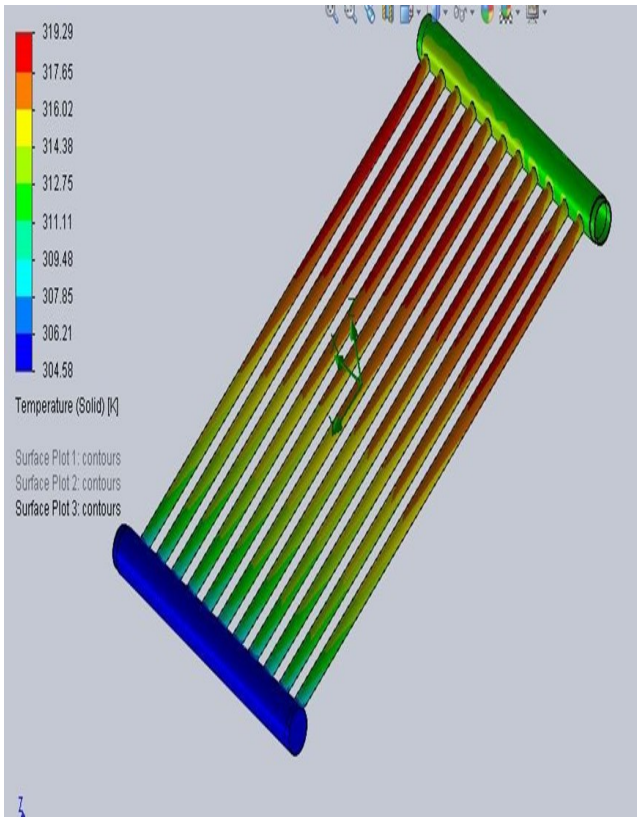


Figure 9 : Temperature distribution on the cooling tubes for Copper material

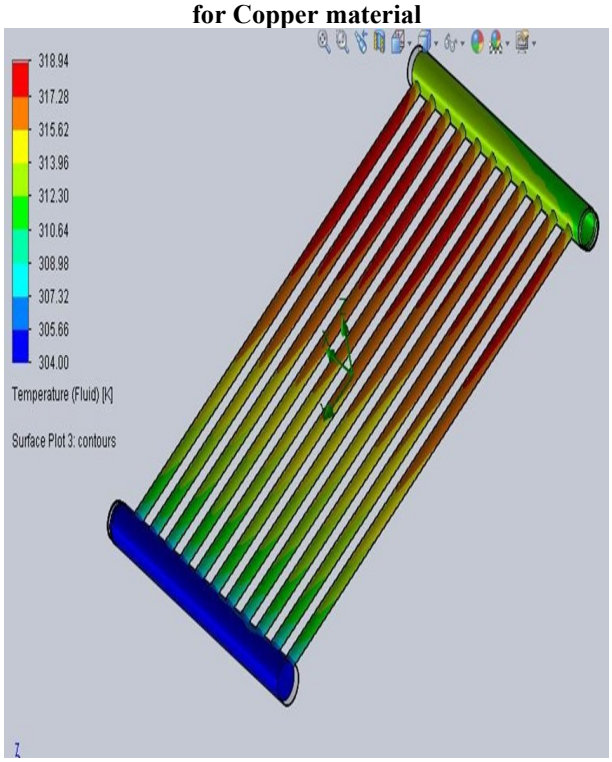


Figure 10 : Shows the fluid temperature on the cooling tubes

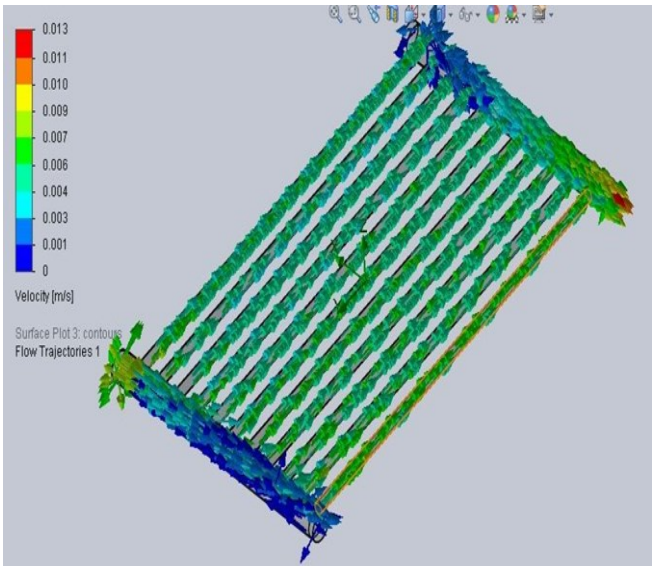


Figure 11 : Velocity of fluid in the cooling tubes

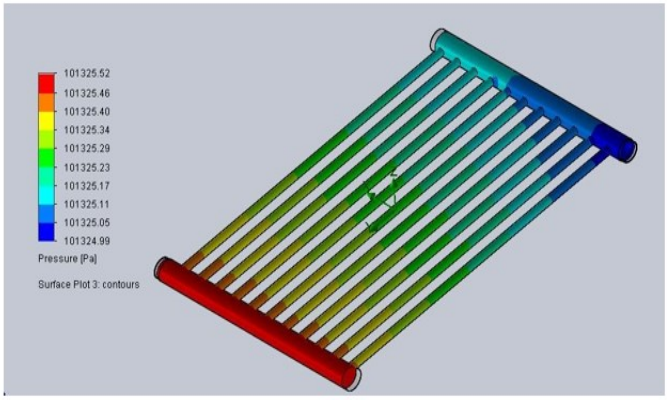


Figure 12 : Pressure of fluid in the cooling tubes

From the analysis the maximum pressure observed is 0.1 Mpa at the inlet. The maximum pressure observed at the outlet is 0.1 Mpa. It is concluded that there is no pressure drop from inlet to outlet.

From the above analysis the maximum temperature of solid, temperature of fluid, pressure drop and velocities of the fluid are recorded and tabulated. The summary of the results obtained is shown in the below table

Item	Value
Solid Temperature (Aluminium)	319.2 K
Fluid temperature (water)	318.9 K
Velocity	0.013 m/s
Thermal efficiency	0.80

Table 2: Summary of the results of the absorber plate with Copper material

8. CFD ANALYSIS WITH ALUMINUM MATERIAL

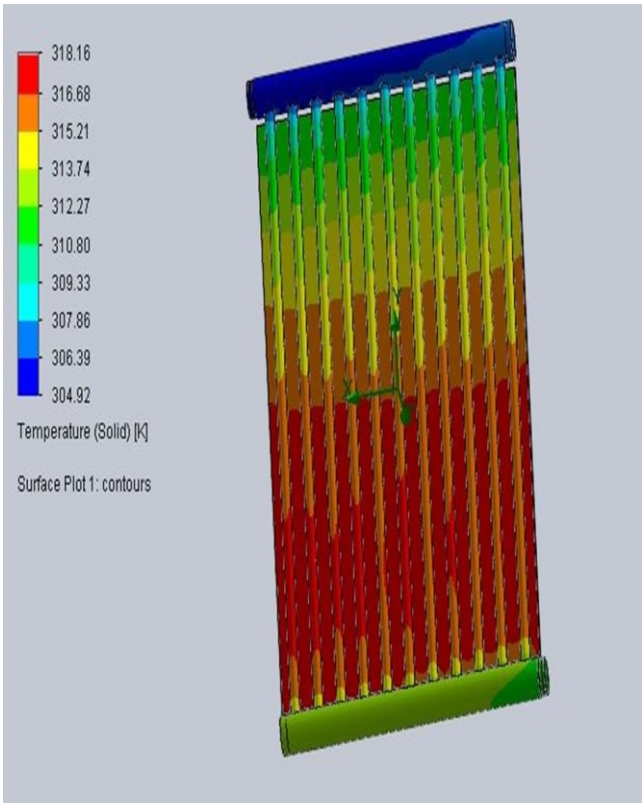


Figure 13 : Temperature distribution on the top side of the absorber plate

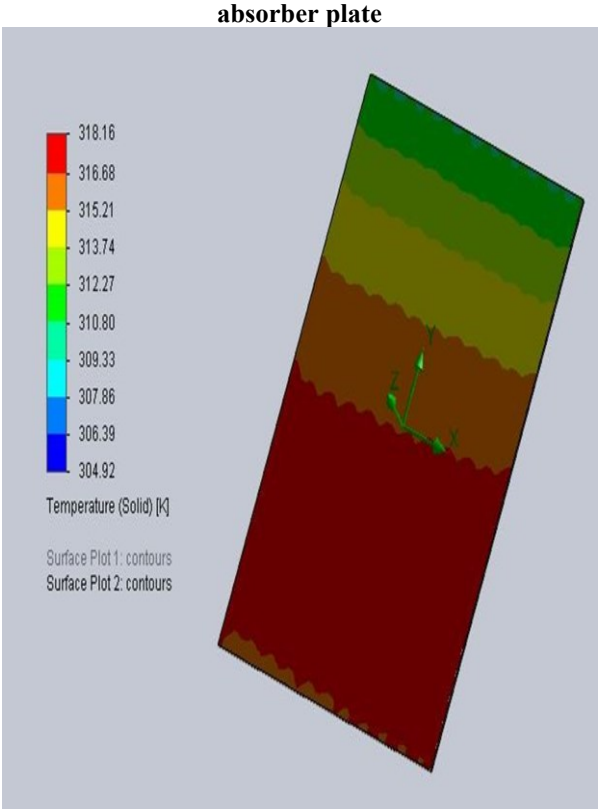


Figure 14 : Temperature distribution of the absorber plate for Aluminum material

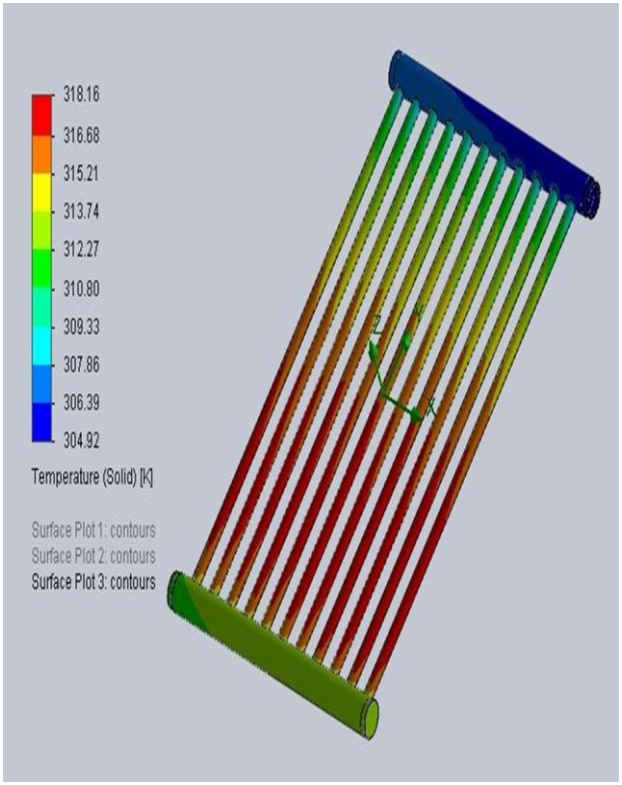


Figure 15 : Temperature distribution on the cooling tubes for Aluminum material

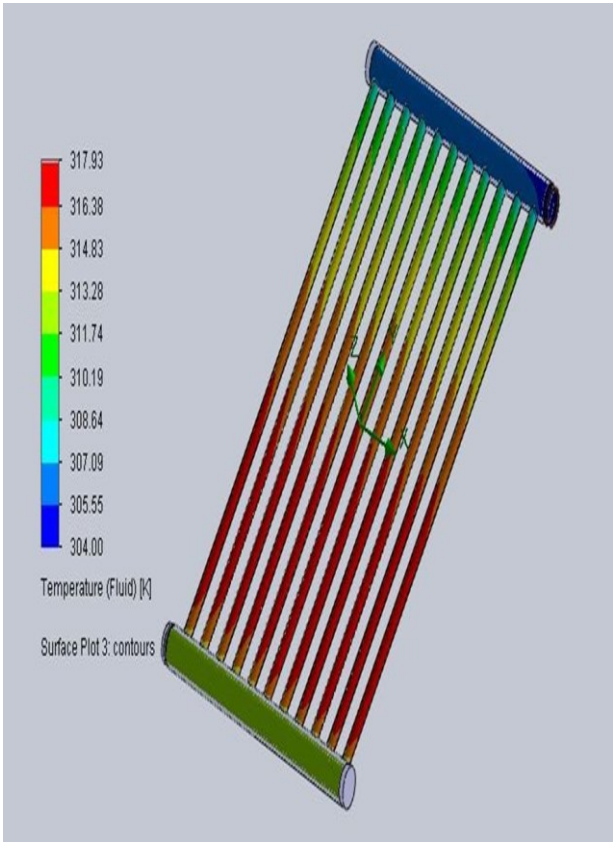


Figure 16 : Temperature on the cooling tubes for Aluminum tubes

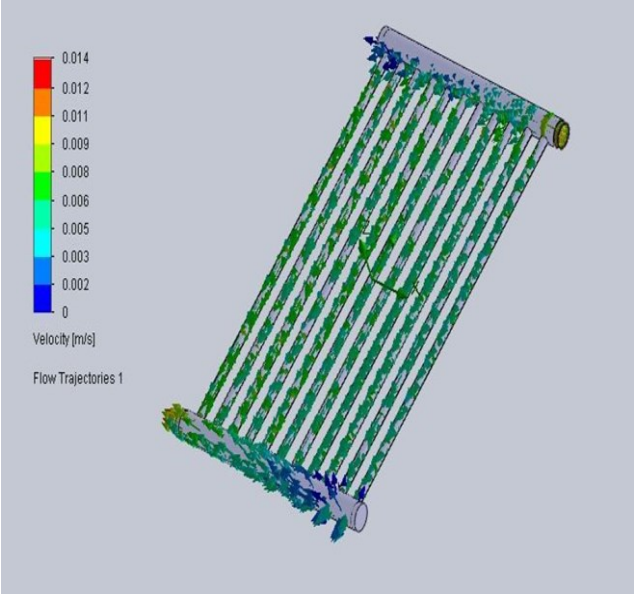


Figure 17 : Velocity of fluid in the cooling tubes

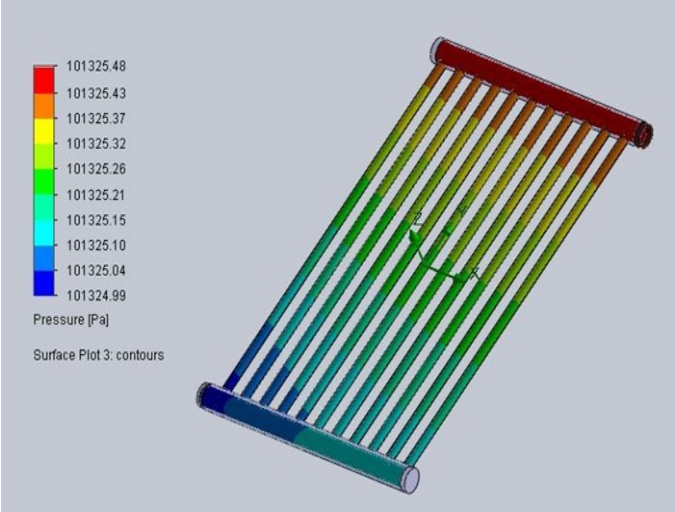


Figure 18 : Pressure of fluid in the cooling tubes

From the analysis the maximum pressure observed is 0.1 Mpa at the inlet. The maximum pressure observed at the outlet is 0.1 Mpa. It is concluded that there is no pressure drop from inlet to outlet.

From the above analysis the maximum temperature of solid, temperature of fluid, pressure drop and velocities of the fluid are recorded and tabulated. The summary of the results obtained is shown in the below table.

Table 3 : Summary of the results of the absorber plate with Aluminum material

Item	Value
Solid Temperature (Aluminum)	318.1 K
Fluid temperature (water)	317.9 K
Velocity	0.014 m/s
Thermal efficiency	0.74

9. CONCLUSION

In the present work, heat transfer analysis on the absorber plate are studied by means of Computational Fluid Dynamics (CFD). The analysis was carried out to investigate the effect of material, mass flow rate, riser position and riser shape. From the analysis the following observations were madeIt is observed that the solar absorber plate with aluminum is having 6% less thermal efficiency than Copper plate.

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PERFORMANCE ANALYSIS OF SOLAR FLAT PLATE COLLECTOR

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Abstract: Now a days the usage of natural resources are highly in progress because artificial resources such as electricity, gasoline, fuel etc are in declination stage and are very expensive. Solar radiation from sun is emitted and falls on earth surface this radiation is collected by using solar collectors. The present work is aimed to predict the performance of flat plate collector tested for 3different days, using an application of water heating. The material used in the work is absorber plate, tube or pipe made of GI, casing and glass. The absorber plate material is mild steel and tube or pipe material is galvanized iron. Mild steel material have absorbility is about 0.8 with black paint coated. The tube material is galvanized iron which is mild steel with coated with zinc for corrosion resistance. For this selection of material the maximum efficiency obtained was 9.75% at temperature 670 c

Keywords: Flat Plate Collector (FPC), Tout(Outlet temperature), Tin(Inlet Temperature), Glazing cover, Glazing frame, absorber plate

1. INTRODUCTION

Solar energy is the energy that sustains life on earth for all plants, animals and people. It provides a compelling solution for society to meet their needs for clean and abundant sources of energy in the future. Energy has played a key role in bringing about our modern civilization. In the era of modern civilization, energy demands are likely to increase for power generation for industrial and domestic usage. Solar radiation is primarily transmitted to the earth and is collected by using collectors. Solar radiation provides enormous amount energy. Solar radiation has been utilized for centuries by peoples for heating and drying. Solar water heating is one of the most successful applications of solar energy.

Solar collectors domestic applications are flat plate, evacuated tube, or concentrating collectors. Flat plate collector (FPC) is a special kind of heat exchanger that transforms solar radiation energy to internal energy which is transferred through a working liquid. This is commonly found in domestic home.

The principles involve in FPC is to gain as much as possible the radiation energy from the sun by heat absorption. The energy which has been collected is transferred through conduit tubes by working fluids (usually water) which are integrated with heat absorber plate. Then, the warm water carries the heat to the hot water system or to storage subsystem which can be used during low sun radiation.

In FPC, the ability to absorb more energy is most important in its thermal performance. The heat absorber plate serves as the central component of the flat plate collector. When the absorber plate absorbs more heat from the Sun, the outlet temperature (T out) should have higher value from inlet temperature (T in) Thus, from the temperature values, efficiency of the FPC can be obtained. For domestic water heating, the FPC can heat the water up to 50°C.

The most common collector types are evacuated tubular collectors (ETC) and flat plate collectors (FPC) without vacuum. Different types of these collectors are described below. Concentrating collectors (Parabolic trough, Fresnel etc.) may also be used, but since a large part of the annual irradiation is diffuse – especially in the northern part Europe – and of these types do not utilize the diffuse part, they are not described further in this fact sheet.

A. Problem Statement

The ability of the heat absorber plate to absorb more heat from the sun and maintain the heat is the main key in FPC performance. The efficiency of the FPC is defined as the ratio of the useful gain over some specified time period to the incident solar energy over the same period of time .Heat absorbed by FPC depends on thermal properties as well as on the design of the heat absorber plate. Material of the heat absorber plate plays a crucial role in the heat absorbing ability due to the thermal properties. Moreover, the correct thickness important in absorber plate selection. In this project, mild steel and galvanized iron is used for absorber plate and tube respectively.

The optimization of thickness and material used in the design of the

FPC will yield the desired effect to maximize its efficiency

2. MODELING AND WORKING

A. Components Of A Flat Plate Collector

A flat plate collector is a basic and simple heat absorber which absorbs heat from the sun radiation. Flat plate collector as known now was developed by Hottel and Whillier in the 1950s.

Basic flat plate collector in Fig 1 consists of few components and their basic function are stated as

(i) **Glazing cover** – transparent cover typically glass which is put on the top of flat plate collector.

(ii) **Glazing frame** – to hold the glazing material.

(iii) **Tubing or fluids pipe** – to facilitate the flow of the working fluid. Water is commonly used as working fluid. Fluid enters at inlet connection and exit at outlet connection.

(iv) **Absorber plate** – to absorb incident solar radiation to gain heat. Then allowing efficient transfer of heat to a working fluid.

(v) **Insulator** – To minimize heat lost from the bottom and sides of the casing.

(vi) **Casing** – A water-proof box surrounds the foregoing components and keeps them free from dust and moisture.

Figure 1: Model of Flat Plate Collector

B. Glazing Material

The purpose of a glazing material is to transmit the shorter wavelength solar radiation and block the longer wavelength reradiating from the absorber plate and reduce the heat loss by convection from the top of the absorber glazing also acts as the cover on the top of the collector casing.

The commercially available window glass will have normal incidence transmittance of about 0.87 to 0.90. Transparent plastic is also generally used as glazing material in FPC. This plastic poses high short wave transmittance but because most of the plastic properties which cannot stand the ultra-violet radiation for a long time period, transparent plastic is unpopular as glazing material in flat plate collector. Table 1 shows transmittance for various glazing material when the direct solar radiation is perpendicular to the glazing material. Crystal clear glass and window glass have highest transmittance of solar radiation. The ability of the glass makes it suitable as heat trap in the collector. Thus, window glass is suitable because it is widely used in local flat plate collector.

Table: 1 Transmittance of various glazing material.

Material	Transmittance (τ)
Crystal glass	0.91
Window glass	0.85
Acrylate, Plexiglass	0.84
Polycarbonate	0.84
Polyester	0.84
Polyamide	0.80

C. Tubing

There are two types of tubing configuration usually found in flat plate collector namely parallel configuration and serpentine configuration.

D. Parallel Configuration

Most flat plate collector has small parallel tubes connected to a larger main carrier pipes as shown in Fig 2. These small parallel tubes are called riser tubes because this is where the working fluids would rise in order to harvest the heat from the sun. The parallel tube is designed to transport working fluid from the bottom of the flat plate collector to the top of the flat plate collector. The fluids pressure is higher at the base of the collector and least at the top. If the top and bottom pipes are large, the pressure difference is moderated and the flow rate in each of the parallel pipes is more uniform. Unfortunately, the flow rate is minimal at the centre where most of the heat is concentrated. Other problems associated with this configuration are the cost and leaking problems. One small leak can cause catastrophic mess in experimentation and calculation.

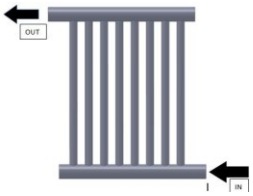


Figure 2: Model of Parallel Tube

E. Serpentine Configuration

The serpentine flow in Fig 3 below consists of one long continuous flexible tube so there is no problem with uniform flow rate. The working fluids flow continuously from bottom to the top of the collector. This results in steady heat transfer from the heat absorber to the working fluid. Since the flow rate of the fluid through

the serpentine tube is uniform the heat collection process is uniform. The size of this flexible tubing is an important consideration. The common size used for tubing is ½ inches of diameter. Thus, serpentine configuration is used in this investigation due to uniform fluid flow resulting uniform heat transfer from absorber plate to working fluid. Furthermore, serpentine configuration is easier to construct compare to parallel which have many
welding joints. The probability of leaking in parallel configuration is high compare to serpentine configuration. galvanized pipe is used in this project because it has anti corrosive and easy to fabricate.

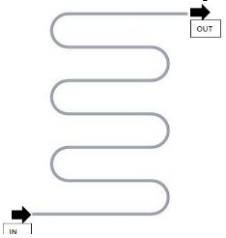


Figure 3: Model of Serpentine Flow

F. Heat Absorber

The primary function of the heat absorber plate is to absorbed as much as possible of the radiation reaching through the glazing at the same time to lose as little as possible radiation reflecting upward to the atmosphere and downward through the back of the container later transfer the retained heat to the circulating working fluids. Fluid out Fluid in.

In FPC, the heat absorber is usually made of mild steel. In this project, is used for investigation because both of the material has thermal conductivity. Factors that determine the material selection is its thermal conductivity, its durability, easy handling, cost and availability. Heat absorber plate usually given a surface coating, mainly black, that increases the fraction of available solar radiation absorbed by the plate.

G. Plate coating.

Flat black colour has high absorbance value compare to other colour which make it suitable for heat absorber plate coating. The absorbance (α) for black paint is between 0.92 to 0.98. The black paint is applied by spraying on the plate. Some are heat treated to evaporate solvents and improve adherence. These surface must be able withstand repeated and prolonged exposure to the relatively high temperature.

Flat black color is used in this project because it has higher radiation. The flat black colour minimizes the transmission of outgoing radiation and the FPC can minimize the unwanted reflection. Moreover, material thickness also plays part in heat absorption.

H. Insulator

FPC must be insulated to reduce conduction and convection heat losses through the back and side of the collector box insulation material as shown in fig 4 should be the dimensionally and chemically stable at high operating temperature. The thickness of the insulator could contribute to the structural rigidity. This investigation used polystyrene as insulation because it is cheap, easy to find and the most importantly is the polystyrene has good heat insulation characteristic.

Figure 4: Insulation Material.

3. OPERATION FLOW RATE

Suitable flow rate must be used in this investigation. As mass flow rate increase, the operating temperature decrease resulting lower efficiency The suitable flow rate used in this project was set between 0.2 lit/min to 0.25lit/min Working fluids is allowed to flow steady enough to ensure the heat from the absorber plate is transferred uniformly. Temperature difference between the inlet and the outlet are easily measurable when the fluid temperature is already in steady state condition.

4. WORKING

Flat-plate collectors, developed by Hottel and Whillier in the 1950s, are the most common type. They consist of a dark flat-plate absorber a transparent cover that reduces heat losses, a heat- transport fluid (air, antifreeze or water) to remove heat from the absorber, and a heat insulating backing. The absorber consists of a thin absorber sheet (of thermally stable polymers, aluminum, steel of copper, to which a matte black or selective coating is applied) often backed by a grid or coil of fluid tubing placed in an insulated casing with a glass or polycarbonate cover. In water heat panels, fluid is usually circulated through tubing to transfer heat from the absorber to an insulated water tank. This may be achieved directly or through a heat exchanger Most air heat fabricators and some water heat manufacturers have a completely flooded absorber consisting of two sheets of metal which the fluid passes between. Because the heat exchange area is greater they may be marginally more efficient than traditional absorbers. Sunlight passes through the glazing and strikes the absorber plate, which heats up, changing solar energy into heat energy. The heat is transferred to liquid passing through pipes

attached to the absorber plate. Absorber plates are commonly painted with "selective coatings," which absorb and retain heat better than ordinary black paint. Absorber plates are usually made of metal—typically copper or aluminum—because the metal is a good heat conductor.

5. DESIGN AND FABRICATION OF FLAT PLATE COLLECTOR

Basically, the FPC is rectangular in shape. The FPC is fixed with wheels at the bottom for easy manoeuvre. A handle has been fabricated and
attached for handling easiness. Measurement instruments like thermometers and flow meter were fixed at the both.
Solar thermal Collector has following basic things for fabrication:

- Outer Cabinet Box
- The Piping Network & Plumbing

A. Outer Cabinet Box

The outer cabinet box of the solar thermal collector is fabricated out of waterproof Plywood. The box has dimension as shown in table 2:

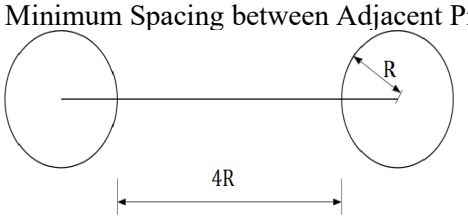
Table 2: Dimensions of outer cabinet box

Units	Size	Thickness
1	0.97m X 0.6m	6 mm
2	0.97m X 0.10m	6 mm
3	0.60m X 0.10m	6 mm

The planks were attached with the help of Steel Nails (2.3 cm) & the Gaps were sealed using Glue and Sealing Materials. The box was cut at the required places to allow Pipes for Inlets and Outlets.

B. Piping Network & Plumbing

Galvanized iron pipes were used for the purpose of Heating.
Dimension of the Pipes used (As per market availability):
Outer diameter: 1.8 cm Inner diameter: 1.7 cm Thickness: 1mm
Number of Pipes used: 5
Length of the pipes: 0.650m (Keeping 2.5 cm clearance along the length from the outer Box on both sides)
Minimum Spacing between Adjacent Pipes



The minimum space between adjacent pipes should be kept 4R, where R –Radius of the Pipe. The basic laws of Light and Shadowing Supports the fact. Fig 5shows the Spacing between pipes If pipes are spaced at 4R distance from each other, the possibility of one pipe overshadowing another pipe during any time of the day is eliminated. So the active distance between to adjacent pipes becomes 6R.
6R distance is equivalent to = 6 X 0.9 = 5.40 cm (Minimum Spacing)
Now total number of pipes that can be spread out over the breadth of the Box
= (Box breadth/ Pipe spacing)
But for uniformity and Keeping additional Safety clearances in mind, we take 5 pipes for Fluid Flow. We then assumed the Spacing between pipes to be
6.5 cm & then carryout the necessary Calculations. Then we have 5 inter pipe spacing of 6.5 cm each
making the length up to 0.650m & so we divide the rest area into 2. ie; of 7.5 cms each.

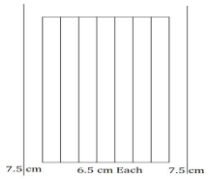


Figure 5 : Piping network and space

C. Testing of absorber plate:

Take a one liter of container filled with water and dip a absorber plate in the container with a thermometer and do some required insulation on the top of the container placed the container below the sun and wait for 15 to 20 minutes and take the readings on thermometer and note down the readings. After that do the same procedure once again but with a absorber plate coated with black paint and note the readings. Below fig 6 shows the set up of a testing of a absorber plate.

Figure 6: Testing of Absorber Plate

D. Key Features In The Fin Design

Fins are wrapped all over the Tube surface very rigidly. The fins cover the interspace between the adjacent tubes increasing surface area for Heat Collection. The fins are in a definite geometry. ie; They have a fixed curvature having their focus at the pipe center, so as to reflect the unabsorbed light rays on to the Tubes. So, if say absorptivity of the aluminum sheet is 50%, then it conducts the 50% heat to the pipes by means of conduction ,rest 50% heat in form of light rays are concentrated on to the pipes. So ideally the heat losses

are assumed to be zero.

Forms of Heat Transfer from Sun's Rays

1- Direct Insolation of Sun's Rays on the Black painted Tube Surface.

2- The direct Conduction of Heat on the Metal Fins from direct Sunlight.

3- Heat in the form of sunrays reflected from the Glossy metal Surface on to the tube.

E. Fin fabrication

For fabricating the fins the following steps were followed:

- The sheet was cut using scissors at the desired markings
- Then the pipe was then kept on the Sheet at the desired spot & clamped.
-The sheet was then carefully & neatly rolled over the pipe and bent at the right places by applying pressure.
- Holes were drilled at the ends of the sheet, through which wires were put to fasten the sheet to the pipe.
- Then the Fins were curved at the required angle so as to act as solar concentrators.

6. FINISHING WORK & THE FINAL MODEL

The outer cabinet box was painted pitch black. The piping network was then spread in the box & the Inlet and outlet pipes were taken out at the desired spots. The whole piping network was then supported on wooden stands attached to the cabinet body and then clamped securely to the box. Then the fins were placed on the pipes very carefully, so as to minimize the air gap between the fins and the tubes. Fastening wires were used at the desired spots to make the model robust. Araldite Glue & Adhesives were used wherever sealing was essential, to reduce heat & material losses.

7. FLAT PLATE COLLECTOR SPECIFICATIONS:

Specifications and the materials used in fabrication of flat plate collector are tabulated in table 3.

Table 3: specifications of the FPC for this project.

Component	Unit
Length of collector	726 mm
Width of collector	457.2 mm
Thickness of collector	101.6 mm
MILD STEEL tube (diameter)	18 mm
MILD STEEL tube (thickness)	1 mm
Tube spacing	60 mm
Tube overall length	3960 mm
Material of absorber	Mild steel
Plate thickness	18 gauge
Insulator material	Polystyrene
Insulation thickness (bottom)	60 mm
Insulation thickness (side)	10 mm

Materials for fabrication process can be easily found in local hardware workshop.

8. LOCATION OF EXPERIMENT

This project was conducted at the Muffakham Jah College of Engineering and Technology. The coordinate for the location is 17°39′N; E 78°43 23.378′E.

9. EXPERIMENTAL SETUP

The determination of the flat plate collector and the tilt angle as shown on fig 7 & 8, efficiency must be done in standard operation. ASHRAE 93-77(2003) method is widely use in testing collector efficiency. The test requires a minimum total solar irradiance of
790 W/m 2. The collector is exposed under the Sun while the fluid is circulating under operational flow rate. The collector is set horizontal to the ground.

The principal measurements made in each data set are fluid flow rate, fluids inlet and outlet temperature and solar irradiance. All data are tabulated in a form (Appendix A) for every hour starting from 1000H until 1700H. Data are then plotted in a graph. Data analysis from the graph is essential to obtain the efficiency of the flat plate collector.

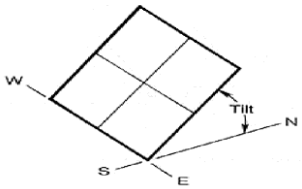


Figure 7: Flat-plate collectors facing south at fixed tilt.

Figure 8: Experimental Setup of flat plate collector

10. FLAT PLATE COLLECTOR EFFICIENCY

The efficiency of flat plate collector can be evaluated by an energy that determines the portion of the incoming radiation delivered as useful energy to the working fluids For flat plate collector, the useful heat gain (Q_U) can be calculated by the formula below.

$Q_U = mc_p(t_o - t_i)$ Where

Q:the useful heat gain (watts) m: Mass flow rate (kg/s)

c_p: Heat capacity at constant pressure (kJ/kg.K) t_o: Fluid outlet temperature (°C)
t_i: Fluid inlet temperature (°C)
After obtaining the useful heat gain, (Q_u), the efficiency of the flat plate collector can be calculated by using;

$\eta = Q_U / A * I_T$

I_t : energy gain from solar radiation (W/m^2)

A_c : collector absorber area (m^2)

Q_u: enegy absorbed by the flat plate collector (W)

11. EXPERIMENTAL SETUP

The experimental setup as shown in fig 10 consists of:

- The fabricated SWH (Solar water heating System)
- Plastic water pipes
- Flow control valves (1no.s)

An Insulated Water Storage Tank

- Cardboard Sheets & other Insulation materials.
- Steel/Wooden support for mounting the SWH
- Water & Power Supply
- Thermometer/ Temperature measuring equipment

Figure 9: Experimental Setup

12. PROCEDURE

- The open garden place (without shade) was chosen for the experiment.
- The true South direction was determined with the help of compass & then the SWH was fixed properly on wooden/steel supports facing the South direction while making an angle of 30 degrees with the ground.
- The flow connections were made proper & the pump was switched on.
- The outlet temperature in the insulated box was measured at regular intervals of time, with different flow rates of water.

13. RESULTS AND DISCUSSION

After conducting the experiment for consecutive 3days in the month of April(8^{th}, 9^{th},&10^{th}-2014), the radiations are tabulated in table 4 and the results obtained from this radiation data are shown in table 5 and the graphs are plotted in fig 11 & 12.

Table 4: radiation as on 8, 9,10th of april 2014.

Days	TIME	RADIATION WH/M^2
8^{th} April	11:00	1129
	12:00	1156
9^{th} April	11:00	1103
	12:00	1106
10^{th} April	11:00	1141
	12:00	1153

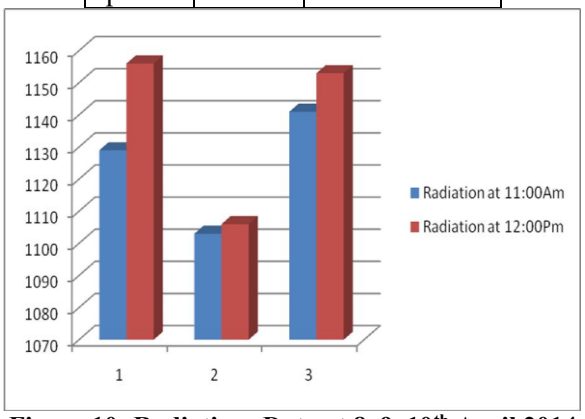


Figure 10: Radiations Data at 8, 9, 10th April 2014

Table 5: Experimental Data As On 8, 9,10th April 2014

	TIME	Ti	To	Flow rate litre/min	Angle	H %
8^{th} April	11:00	28°	61°	0.225	30°	7.71
	12:00	28°	67°	0.225	30°	9.75
9^{th} April	11:00	26°	45°	0.225	30°	7.01
	12:00	26°	49°	0.225	30°	8.35
10^{th} April	11:00	28°	45°	0.225	30°	7.31
	12:00	28°	56°	0.225	30°	9.55

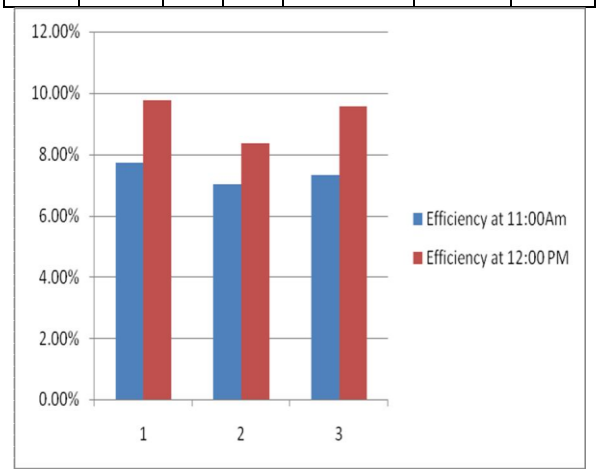


Figure 11: Efficiency graph for 8, 9, 10th April 2014

14. CONCLUSION

The solar heater collector thus fabricated was put to test under the sun while circulating water through it at 0.225 litre/min flow rates. The results obtained were satisfactory and the SWH efficiency went as high as 9.75

% on 8th of April. These types of solar water heaters can easily be used to heat domestic application. A flow rate comparable to that of 15 lph is best for heating. The heaters are to be used intermittently for heating a batch of water till 15-20 minutes until the efficiency drops down and then fresh water be circulated through it.

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DESIGN AND FINITE ELEMENT ANALYSIS OF MISSILE CANISTER

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Abstract: Cylindrical pressure vessels are widely used for commercial, under water vehicles and in aerospace applications. At present the outer shells of the pressure vessels are made up of conventional metals like steels and aluminium alloys. The payload performance/ speed/ operating range depends upon the weight. The lower the weight the better the performance, one way of reducing the weight is by reducing the weight of the shell structure. The use of composite materials improves the performance of the vessel and offers a significant amount of material savings. Moreover, the stacking sequence is very crucial to the strength of the composite material. This Paper involves various objective functions such as orientation, composition and buckling load. Canister is a cylindrical pressure vessel used to store and launch a missile. The matrix and fibre reinforcement used are Epoxy resin and glass fibre cloth. The design considerations are 30 bar (internal pressure) and 5 bar (external pressure). External pressure causes buckling and buckling analysis is also performed. Theoretical calculations are done to find out the inclination of piles, fiber fraction for maximum strength. The Comparisons are made for two different approaches i.e. the finite element model and the theoretical model. A 3-D finite element analysis is built using ANSYS-Workbench software into consideration, for static and buckling analysis on the pressure vessel. Safe design is known by comparing the factor of safety of theoretical and analysis.

Key Words: Composite material, Shells, Fiber orientation, composition, Critical Pressure, Buckling

1. INTRODUCTION

Missile is an object capable of being projected, usually with the intent of striking some distant object. All the more especially, a missile is generally a weapon that is self-propelled in the wake of leaving the starting gadget. As it were, missile is a rocket propelled weapon intended to convey an unstable warhead with awesome exactness at fast. Missiles are tough, very much developed machines. Be that as it may, in light of their size, weight, and mass, they are not that simple to deal with nor are missiles indestructible. Most missile harm is, sadly, an aftereffect of imprudence and poor dealing with rehearses. To decrease the likelihood of harm, missiles are shipped, stored and handled with unique equipment's. Affirmed containers, canisters, and dealing with gear's furnish most extreme missile security with least taking care of by work force. The missile compartment utilized beforehand was of top kind (bag) containers. This kind of compartment has extensive contact territory at the end locale. So it is imperative that the producer needs to take outrageous care in delivering this compartment with no warpage at the end district. Else there will be a leakage of gas from the hole created due to warpage. In this manner the assembling turns out to be more unpredictable and more costly. Missile is a question equipped for being anticipated, as a rule with the purpose of striking some far off protest. All the more especially, a missile is typically a weapon that is self-propelled in the wake of leaving the starting gadget. As such, missile is a rocket-propelled weapon intended to convey a hazardous warhead with extraordinary exactness at rapid. Missiles are durable, all around developed machines. In any case, due to their size, weight, and mass, they are not that simple to deal with nor are missiles indestructible. Most missile harm is, shockingly, a consequence of lack of regard and poor taking care of practices. To lessen the likelihood of harm, missiles are shipped, stowed and handled with unique equipment's. Affirmed containers, canisters, and dealing with hardware's furnish most extreme missile wellbeing with least taking care of by work force.

2. LITERATURE REVIEW

A missile is damaged shockingly because of carelessness and poor dealing with practices. A published paper, "Design and Analysis of a Storage Container used in Missile" by Prudvi Raju. Devarapalli, Venkata Ramesh Mamilla, designed a container which is used for transportation and storage of missile. To decrease the possibility of damage, missiles are shipped, stored and handled with affirmed missile containers. Endorsed containers, furnish greatest missile safety with least taking care of by personnel. This makes the design and

assembling of missile container a basic significance. The Missile container is made of composite shell structure. It is studied that there are several causes of disturbances which damages the canister such as inward pressure load, Stacking load, Braking load and lifting load. Finite element stress analysis is done to decide the static response of the designed composite missile container structure under mechanical loads.

Epoxy resins are portrayed by phenomenal mechanical and thermal properties, high chemical and corrosion resistance, low shrinkage on curing and the capacity to be processed under an assortment of conditions. This is known from the paper "strength portrayal of E-glass Fiber Reinforced Composite with Filler Materials" by K. Devendra1, T. Rangaswamy. E-glass fiber was used alongside hardener K-6. Fly ash, Al2O3, Mg(OH)2 and hematite powder was used as filler materials. Fabrication of Composites and Specimen Preparation was clarified obviously. The mechanical conduct of E-glass fiber rein-constrained epoxy composites filled by shifting centralization of fly ash Al2O3, Mg (OH)2 and hematite powder has been studied and clarified. Results show that composite filled by 10% volume Mg(OH)2 displayed greatest hardness number when contrasted and other filled composites this because of uniform dispersion of Mg(OH)2 particles and great bonding strength amongst fiber and matrix.

When all is said in done, the tensile strengths of the natural fiber reinforced polymer composites increase with fiber content, up to a most 17 extreme or ideal esteem, the esteem will then drop. This was demonstrated in paper "An audit on the tensile properties of natural fiber reinforced polymer composites" by H Ku+, H Wang, N Pattarachaiyakoop and M Trada. In any case, the Young's modulus of the natural fiber reinforced polymer composites increase with increasing fiber loading. Khoathane et al found that the tensile strength and Young's modulus of composites reinforced with bleached hemp fibers increased inconceivably with increasing fiber loading.

The ideal introduction system and lamina stacking is taken after as given in paper "Composite Pressure Vessels", by Rao Yarrapragada, R.krishna Mohan, B.Vijay Kiran. Here various orientations are taken and ideal point is resolved for fiber glass epoxy. It is notable that the measured strength of most materials is considerably smaller than their hypothetical strength because of presence of imperfections or intrinsic flaws in the materials. It is discovered that non polymeric materials have higher strength along their lengths because of small cross sectional. Methodology to decide the building constants is taken after from the book, "Mechanics of composite materials", second release by AUTHUR K. KAW. The step wise technique is taken after for the advancement of the fiber point and fiber proportion.

Universal Code or standard was produced under procedures authorize as meeting the criteria for American National Standards. The design system is ASME standards.

3. LAMINATE THEORY

A lamina is a thin layer of a composite material that is generally of a thickness on the order of 0.005 in. (0.125 mm). A laminate is constructed by stacking a number of such laminate in the direction of the lamina thickness. Mechanical structures made of these laminates, such as a leaf spring suspension system in an automobile, are subjected to various loads, such as bending and twisting. The design and analysis of such laminated structures demands knowledge of the stresses and strains in the laminate. Also, design tools, such as failure theories, stiffness models, and optimization algorithms, need the values of these laminate stresses and strains. Generally, a laminate does not consist only of unidirectional laminate because of their low stiffness and strength properties in the transverse direction. Therefore, in most laminates, some laminate are placed at an angle. The laminate theory is used for calculation of engineering constants of laminate placed at different orientations. The present canister is designed based on the properties of epoxy resin and glass fiber.

Specific gravity	2.5
Young's modulus (Ef)	85 GPa
Ultimate tensile strength	1550 MPa
Poisson's ratio (vf)	0.2

Table 1: Mechanical properties of glass fiber (reinforcement phase)

Where Ef = Young's Modulus of glass fiber at 0 orientation
vf = Poisson's Ratio

Specific gravity	1.28
Young's modulus (Ef)	3.792 GPa
Ultimate tensile strength	82.74 MPa

Table 2: Mechanical properties of epoxy (matrix phase)

Where Em = Young's Modulus of Epoxy
Then

Longitudinal young's modulus (E1) = (Ef) (Vf) + (Em) (Vm)
Transverse young's modulus (1/E2) = (Vf/Ef) + (Vm/Em)
Major poisson's ratio (v12) = (vf) (Vf) + (vm) (Vm)
Minor poisson's ratio (v21) =v12*(E2/E1)
Shear modulus of fibre (Gf) = Ef/2(1+vf) =35.42Gpa
Shear modulus of matrix (Gm) = Em/2(1+vm) =1.308Gpa
Shear modulus (1/G12) = (Vf/Gf) + (Vm/Gm)
By using above relations we get the following values

Engineering Constants For Various Proportions Of Glass/Epoxy

Composition	Longitudinal (E_1)	Transverse (E_2)	Major poisson ratio(v_{12})	Minor poisson ratio(v_{21})	Shear modulus (G_{12})
V_f=0.35, V_m=0.65	32.214	5.71	0.265	0.04	1.97
V_f=0.40, V_m=0.60	36.275	6.72	0.26	0.048	2.127
V_f=0.45, V_m=0.55	40.335	6.666	0.255	0.042	2.309
V_f=0.50, V_m=0.50	44.396	7.299	0.25	0.041	2.525
V_f=0.55, V_m=0.45	48.456	8	0.245	0.040	2.78
V_f=0.60, V_m=0.40	52.516	8.928	0.24	0.040	3.105
V_f=0.65 V_m=0.35	56.577	10.101	0.235	0.041	3.508

Table 3: Engineering constants for various proportions of Glass/Epoxy

3.1 Calculation Of Engineering Constants For Angle Lamina

The elements of the compliance matrix is determined by
S11= $1E1$
S22 = $1E2$
S12 = $-V12E1$
S66 = $1G12$

Table 4: Elements of transformed reduced compliance matrix for Vf= 0.35, Vm= 0.65

4. DESIGN OF A CANISTER

4.1 Launching Of A Missile

The launching of a missile involves creating an internal pressure of 30 bar by using chemical reactions inside the canister due to which missile is ejected. Here we are considering the specifications of canister AGNI V for the design .It is designed for resisting a pressure of 30 bar internal pressure. Since we are considering that missile is in submarine, an external pressure is also created. As we know for every 2 meters depth a pressure of 1 bar is developed, presently we are considering the canister is at 10 meters depth and a pressure of 5 bar is acting externally. So our design must resist an external pressure of 5 bar and internal pressure of 30 bar.

4.2 Design Of Pressure Vessel

Typical properties of unidirectional lamina

Property	Symbol	Units	Glass/epoxy
Fibre volume fraction	V_f	-	0.45
Longitudinal elastic modulus	E_1	GPa	38.6
Transverse elastic modulus	E_2	GPa	8.27
Major Poisson's Ratio	V_{12}	-	0.26
Shear Modulus	G_{12}	GPa	4.14
Ultimate longitudinal tensile strength	$(\sigma_1^t)_{ult}$	MPa	1062
Ultimate longitudinal compressive strength	$(\sigma_1^c)_{ult}$	MPa	610
Ultimate Transverse tensile strength	$(\sigma_2^t)_{ult}$	MPa	31
Ultimate Transverse Compressive strength	$(\sigma_2^c)_{ult}$	MPa	118
Ultimate in-planar shear strength	$\tau_{12})_{ult}$	MPa	72

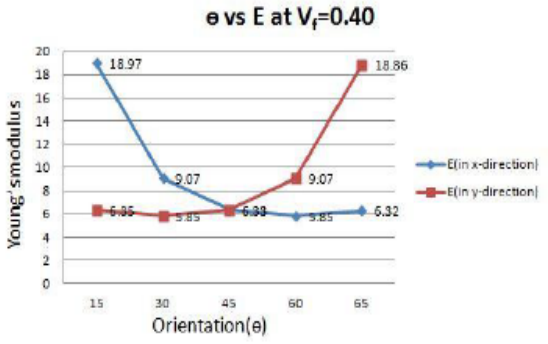
Table 5: Typical properties of unidirectional lamina

Thickness of shells

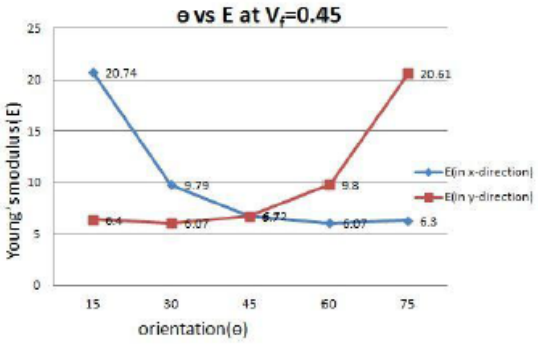
The thickness of shells under internal pressure shall not be less than that computed by following equations. The minimum structural thickness is 6mm. The minimum structural thickness of cylindrical shells under internal pressure shall be greater than (a) below but not less than 6mm.

4.3 Orientation Of Fiber

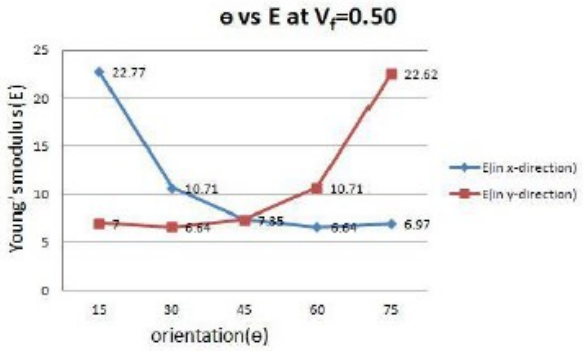
To find out in which orientation the young's modulus is optimum the graph is plotted between angles (ɵ) Vs E (young's modulus) at various volume proportions of fiber as shown below:



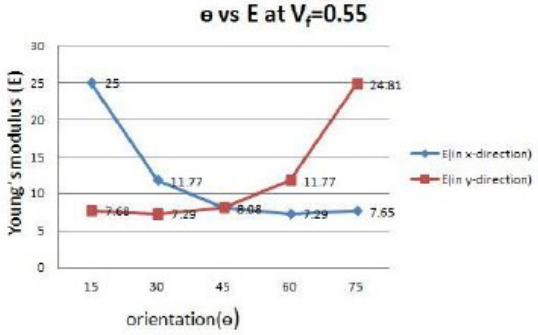
Plot 2: Variation of young's modulus with orientation at 0.40



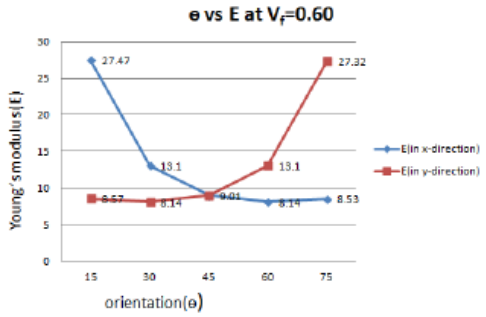
Plot 3: Variation of young's modulus with orientation at 0.45



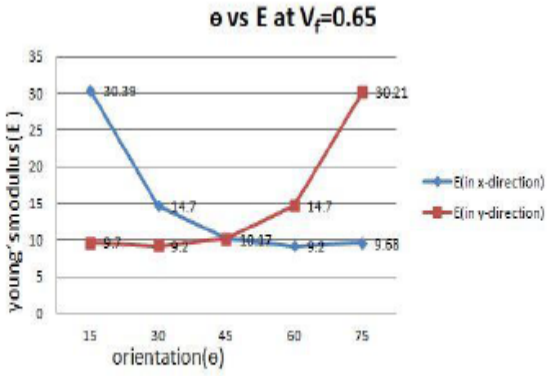
Plot 4: Variation of young's modulus with orientation at 0.50



Plot 5: Variation of young's modulus with orientation at 0.55



Plot 6: Variation of young's modulus with orientation at 0.60



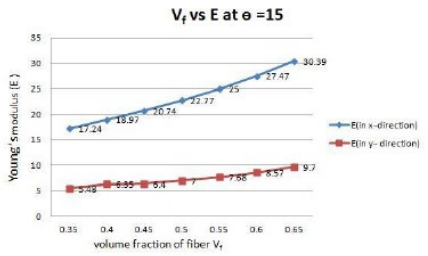
Plot 7: Variation of young's modulus with orientation at 0.65

4.3.1 Conclusion from Graphs

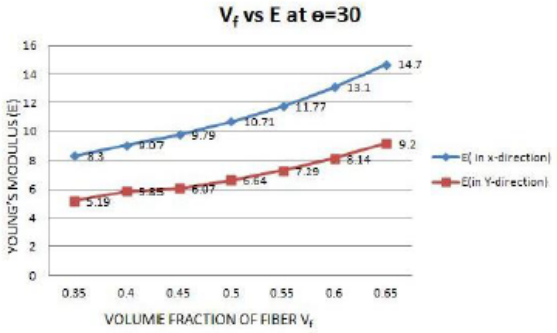
Since the thickness under internal pressure is inversely proportional to young's modulus, more over a unidirectional laminates cannot offer high strength and stiffness properties in transverse direction. So it is important to find out at which orientation maximum young's modulus is obtained. From the graph (plot 1 to 7)) it is clear that between 60° and 75° increase in young's modulus is more. So a fiber orientation angle can be considered between 60° and 75°. Here we took angle of orientation as 67.5°.

4.4 Volume Fractions Of Matrix And Reinforcement Phase

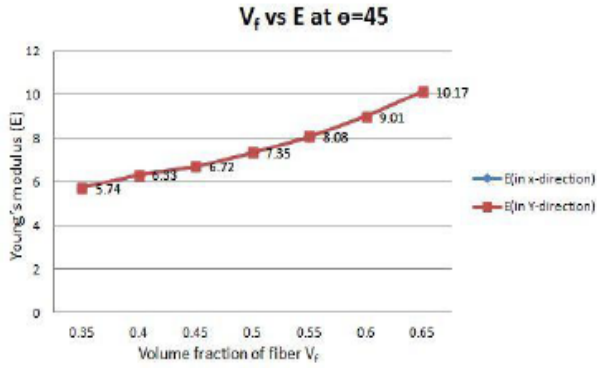
To find in which volume fraction of fiber optimum young's modulus is obtained, graphs are plotted between Vf vs. E at different fiber orientations.



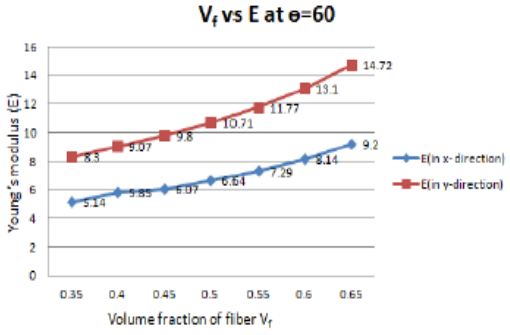
Plot 8: variation of young's modulus with composition at 15° orientation



Plot 9: variation of young's modulus with composition at 30° orientation



Plot 10: variation of young's modulus with composition at 45°



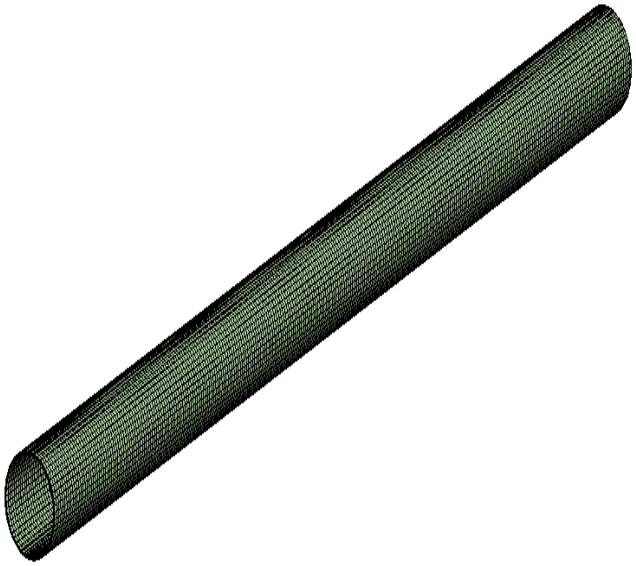
Plot 11: variation of young's modulus with composition at 60° orientation

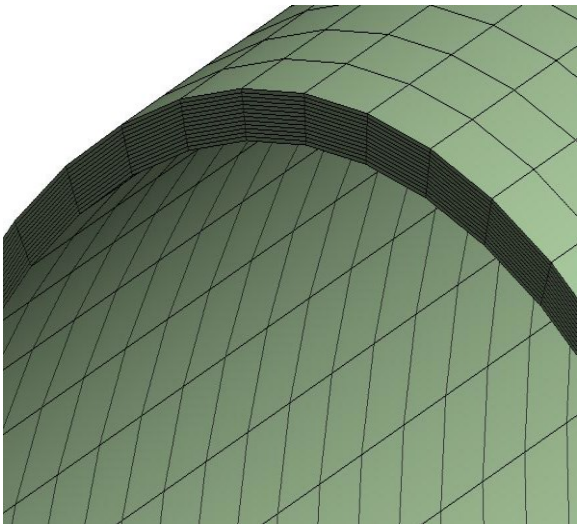
4.4.1 Conclusion from Graphs

From graphs (plot 8 to 11) we can observe that as fiber fraction increases young's modulus also increases, as we know at least 0.35 fiber fraction must be maintained for the laminate preparation, we can consider fiber fractions between 0.35 and 0.65.

The sample laminates are prepared by stacking the plies of unidirectional and 67.5° oriented plies. In pressure vessels longitudinal stress is less than the transverse stress i.e. E1< E2. As young's modulus is directly proportion to stress and stress is directly proportional strength, then load required to fail the material increases. This concludes the strength of the material increases as the fiber fraction increases.

5. ANALYSIS OF A CANISTER





13 Ply's representation

Case: 1

In case 1 only one end of the canister constrained in all 6 DOF i.e. assigned as fixed support.

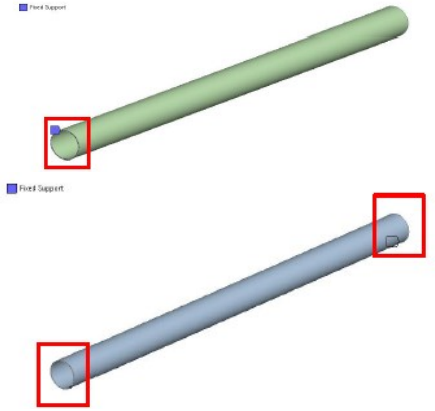


Figure shows the location of fixed support in case 1 & 2

Case: 2

In case 2 both ends of the canister are constrained in all 6 DOF i.e. assigned as fixed support.

5. RESULTS AND DISCUSSION

The calculation of von-mises stresses and strains at required angle is done and analysis is done on canister by applying 30 bar internal and 5 bar external pressure by fixing ends. The results of theoretical and finite element analysis are compared. From tsai wu failure theory the stresses are calculated and are compared with finite element analysis.

Maximum stress obtained on canister is found to be 108.76 Mpa. Location of maximum stress is given in 7.1 figure. Maximum strain obtained on canister for one end fixed case during simulation is .0062 mm/mm. strain plot is given in figure 7.2.

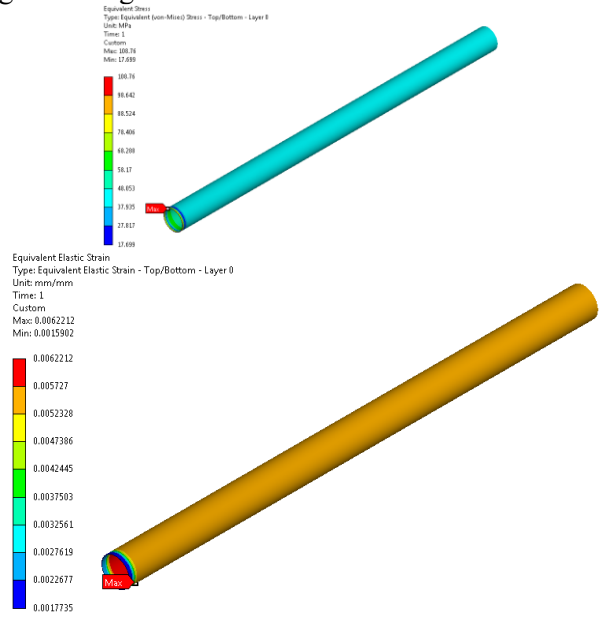


Fig 7.1: One end fixed 30 bar unidirectional stress

Fig 7.2: One end fixed 30 bar unidirectional strain

Maximum equivalent stress obtained on the canister during the simulation for both ends fixed is 119.91.MPa

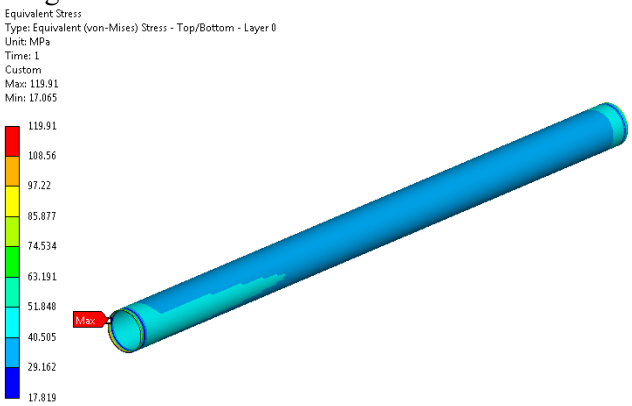


Fig 7.3: Two end fixed 30 bar unidirectional stress

Fig 7.4: Two end fixed 30 bar unidirectional strain

Maximum strain obtained on canister for two ends fixed case during simulation is .0061 mm/mm.

6. CONCLUSIONS

The Lamina stacking sequence is appropriate which is free from extension, bending, coupling which reduces the effective stiffness of the lamina, since the laminates are symmetric.

Appropriate number of plies needed in each orientation and thickness of the shell is safe from static analysis is concerned. The comparison plots obtain desired results for stresses and deformations with lamina orientations for the chosen composite materials.

The chosen fiber volume fraction Vf = 0.60 and Vm = 0.40 is acceptable to the present FRP shell working at 30 bar internal pressure and 5 bar external pressure.

The fiber orientation 67.5 for glass epoxy is correct which optimum value. From the finite element analysis report the maximum stress obtained in each lamina is less than the allowable working Strength of the FRP lamina. So shell design is safe.

Numerical calculations, tables and plots obtained for young's modulus, orientation and volume fractions support the safe design. The factor of Safety 3 taken is sufficient for the fiber reinforced Composite material to overcome material design. Tsai wu failure theory is used to validate the whether the result is validate or not.

7. FUTURE SCOPE

Composites have already proven their worth as weight-saving materials, the current challenge is to make them cost effective. The efforts to produce economically attractive composite components have resulted in several innovative manufacturing techniques currently being used in the composites industry.

Further by using different types of fillers in varying concentrations like fly ash, aluminum oxide, magnesium hydroxide increases the properties of composite materials.

Nano-composites are a class of materials that has gained much interest recently. The potential of producing these materials with tailored properties at low cost are attractive for different applications. By optimization of the fabrication process and controlling the nano-sized second phase dispersion, thermal stability & mechanical properties such as adhesion resistance, flexural strength, toughness and hardness can be enhanced. This exhibits the great advantage of nano-dispersion

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REMOTE CONTROLLED MECHATRONICS SYSTEM

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Abstract: This paper presents controlling of mechatronics system using remote operated. This system has a special feature of smart video transfer and capture feature. The images are transferred to the monitor by the surveillance system. The system is always controlled by the remote operated by human.The remote controlled mechatronics system is aim to use in the situation like natural calamities, to inspect and navigate from remote location and collect the video without wires. It Just by throwing from window the ball can send the images inside the room and also can navigate the video ball from one room to another room to look for people. This is perfect for changeable lighting conditions. High-resolution security cameras have additional light sensors on their digital chips. This includes augment the effective image quality. These cameras are effectual only with high-resolution monitors. Small in size and Simpler to setup. The Wireless digital cameras give sharper effects. In video ball the encoders are given as an input and the decoders are the output. The program is given to the system it transmits by the transmitter and the monitor receive the images by receiver. The wireless video transmit the signal and at remote location the live video issued to inspect the areas where are accessible and non accessible.

Keywords— Remote controlled Mechatronics system, Video surveillance system, Video ball, Microcontroller, Encoder, Decoder.

1. INTRODUCTION

Observing or analyzing a particular site for safety and business purposes is known as video surveillance. Security and crime control concerns are the motivating factors for the deployment of video surveillance cameras. Video surveillance cameras are used in shopping centers, public places, banking institutions, companies and ATM machines. Nowadays, researches experience continuous growth in network surveillance. The reason being is the instability incidents that are happening all around the world. Therefore, there is a need of a smart surveillance system for intelligent monitoring that captures data in real time, transmits, processes and understands the information related to those monitored. The video data can be used as a forensic tool for after-crime inspection. Hence, these systems ensure high level of security at public places which is usually an extremely complex challenge hence video surveillance systems have become more popular. Video surveillance systems have wide range of applications like traffic monitoring [1] and human activity understanding [2]. Presently, the surveillance systems used requires constant human vigilance. However, the humans have limited abilities to perform in real-time which reduce the actual usability of such surveillance systems [3-5]. Also such surveillance systems are not reliable for real time threat detection. From the perspective of forensic investigation, a large amount of video data obtained from surveillance video tapes need to be analyzed and this task is very tedious and
error prone for a human investigator [6-9]. To overcome this drawback, automatic video analysis system is developed that continuously monitors a given situation and reacts in real-time [10]. The proposed system has an ability to sense intrusion and respond to it in real time. The location recognition technology has been so far studied and developed mainly with single interesting object for tracking human and things, mobile asset management, security and etc. Such location recognition technology provides accuracy in interior space within two to three meters without obstacles, but with obstacles, larger range of error is appeared, thus research for recognition of more accurate interior location has conducted. Not only that, interest in location recognition of multiple objects in environment is increased, not in environment with single object location recognition. The requirement to get valid images is very important at the video security surveillance system. Thus, research in video surveillance systems are multidisciplinary field associated to image analyzing and processing, pattern recognition, signal processing, embedded computing, and communication. In this paper presents the working of remote controlled mechatronics system.

2. LITERATURE SURVEY

D. Koller, K. Daniilidis, H. H. Nagel is discussed in Model-based object tracking in monocular sequences of

road traffic scenes-Moving vehicles are detected and tracked automatically in monocular image sequences from
road traffic scenes recorded by a stationary camera. In order to exploit the a priori knowledge about shape and motion of vehicles in traffic scenes, a parameterized vehicle model is used for an intraframe matching process and a recursive estimator based on a motion model is used for motion estimation. Yuri A. Ivanov and Aaron F. Bobick, described in Recognition of Multi-Agent Interaction in Video Surveillance Smart video surveillance systems are capable of enhancing situational awareness across multiple scales of space and time.

3. METHODOLOGY

In designing of remote controlled mechatronics system and installing the necessary equipment, the organization should consider the reception equipment such as video cameras, or audio or other devices should only be installed in identified public areas where video surveillance is necessary to protect public safety, detect or deter, and assist in the investigation of criminal activity. Mechatronics, Micro controller, Power Electronics, Digital Transmission and reception, Video transmission technologies are used. In this present system consist of Atmega 8 microcontroller, 4MHz crystal, HT12E (Encoder), HT12D (Decoder), L293D motor driver, IRFZ44N, RF Modules (receiver and transmitter), 12V DC motors, Video Camera. The ATmega8 micro controller is the main part of entire system. The ATmega8 is a low-power CMOS 8-bit microcontroller based on the AVR RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega8achieves throughputs approaching 1 MIPS per MHz, allowing the system designed to optimize power consumption versus processing speed. The ATmega-8 Microcontroller as shown in fig 1.The power supplies are designed to convert high voltage AC mains electricity to a suitable low voltage supply for electronic circuits and other devices. A power supply can by broken down into a series of blocks, each of which performs a particular function. A DC power supply which maintains the output voltage constant irrespective of AC mains fluctuations or load variations is known as Regulated D.C Power Supply. A transformer is an electrical device which is used to convert

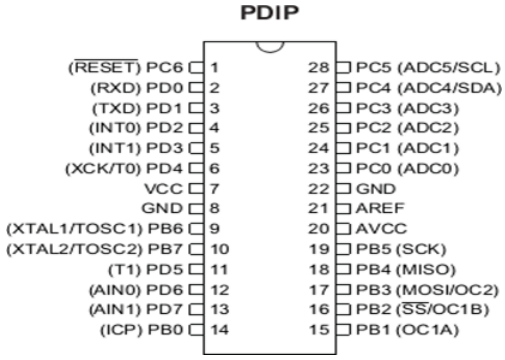

Fig. 1: ATmega -8 Microcontrollers pin diagram

electrical power from one Electrical circuit to another without change in frequency. Transformers convert AC electricity from one voltage to another with little loss of power. Transformers work only with AC and this is one of the reasons why mains electricity is AC. Step-up transformers increase in output voltage, step-down transformers decrease in output voltage. Most power supplies use a step-down transformer to reduce the dangerously high mains voltage to a safer low voltage. The regulated power supply system as shown in fig 2.

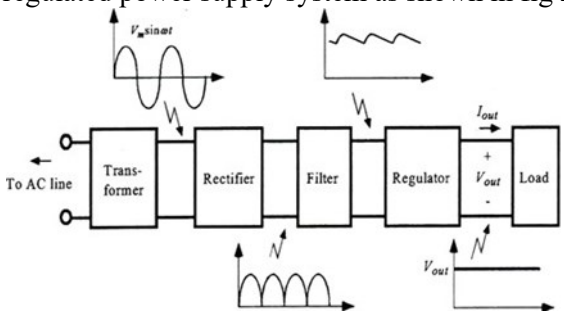

Fig. 2: Components of typical power supply

Voltage regulator ICs is available with fixed (typically 5, 12 and 15V) or variable output voltages. The maximum current they can pass also rates them. Negative voltage regulators are available, mainly for use in dual supplies. Most regulators include some automatic protection from excessive current 'overload protection') and overheating ('thermal protection'). Many of the fixed voltage regulator ICs have 3 leads and look like power transistors, such as the 7805 +5V 1A regulator shown on the right. The LM7805 is simple to use. You simply connect the positive lead of your unregulated DC power supply (anything from 9VDC to 24VDC) to the Input pin, connect the negative lead to the Common pin and then when you turn on the power, you get a 5 volt supply from the output pin. A three Terminal Voltage Regulator is shown in fig 3. A circuit which is used to convert AC to

Fig. 3: Three Terminal Voltage Regulator

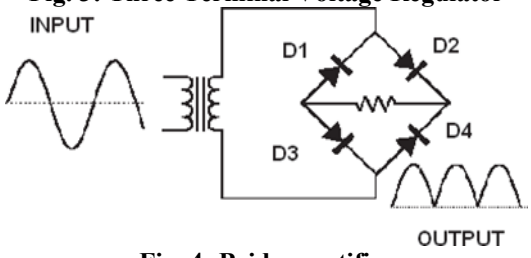

Fig. 4: Bridge rectifier

DC is known as rectifier. A bridge rectifier makes use of four diodes in a bridge arrangement to achieve full-wave rectification. This is a widely used configuration, both with individual diodes wired and with single component bridges where the diode bridge is wired internally. A bridge rectifier makes use of four diodes in a bridge arrangement as shown in fig 4.

4. RESULTS & DISCUSSION

The program is given to the system it transmits by the transmitter and the monitor receive the images by receiver. The HT12 encoders are a series of remote control system applications. They are capable of encoding information which consists of N address bits and 12N data bits. Each address/data input can be set to one of the two logic states. The programmed addresses/data are transmitted together with the header bits via an RF or an infrared transmission medium upon receipt of a trigger signal. The capability to select a TE trigger on the HT12E or a DATA trigger on the HT12A further enhances the application flexibility of the 212 series of encoders. The HT12A additionally provides a 38kHz carrier for infrared systems. The input of microcontroller HT12E encoder as shown in fig 5. The decoders are a series of remote control system applications. They are paired with Holtech212 series of encoders (refer to the encoder/de- coder cross reference table). For proper operation, a air of encoder/decoder with the same number of ad-dresses and data format should be chosen. The encoders receive serial addresses and data from a programmed 212 series of encoders that are transmitted by a carrier using an RF or an IR transmission medium.

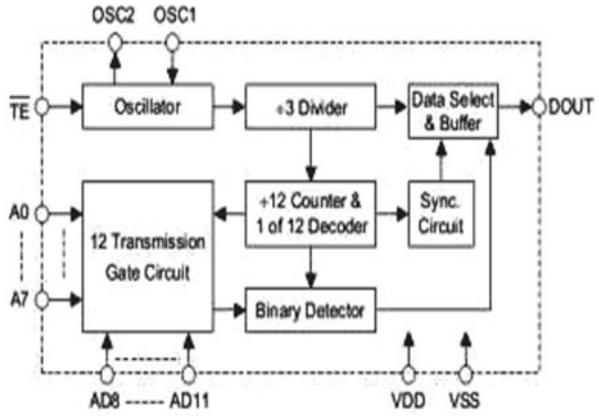

Fig. 5: Input of Microcontroller (HT12E Encoder)

They compare the serial input data three times continuously with their local addresses. If no error or un-matched codes are found, the input data codes are decoded and then transferred to the output pins. The VT pin also goes high to indicate a valid transmission. The 212 series of decoders are capable of decoding information that consists of N bits of address and 12N bits of data. Of this series, the HT12D is arranged to provide 8 address bits and 4 data bits, and HT12F is used to decode 12 bits of address information. The HT12D decoder as shown in fig 6.

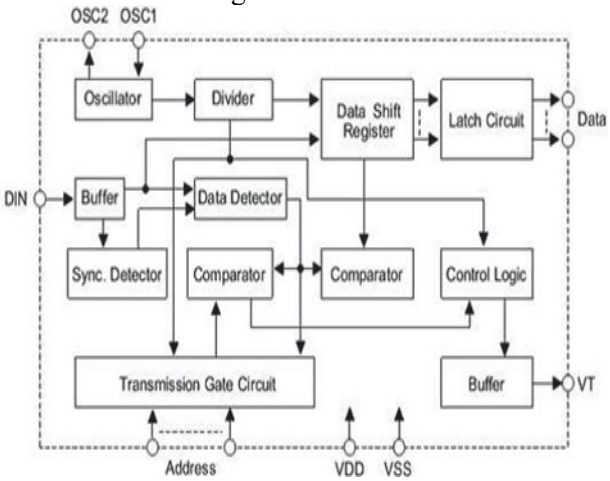

Fig. 6: Output of Microcontroller (HT 12D Decoder)

The wireless 433MHz encoder and decoder signals from the remote unit to navigate the video ball. The wireless video transmit the signal and at remote location the live video issued to inspect the areas where are critical & non- accessible and dangerous. To control the ball robotic moment's forward/reverse & left/right buttons are held on the remote controller. It is shown in fig 7.

F	B

L	R

Fig. 7: Remote controller (keys)

5. CONCLUSIONS

Remote controlled mechatronics system is the solution for asset protection, perimeter monitoring and threat detection. This technology is desirable over other technologies because it is passive, relatively inexpensive, operationally effective, and provides real-time, actionable intelligence. This technology, however, comes with the caveat that the customer has to become educated about its underlying technology and its pliability. Many proponents of computer vision technology are advocating commercial systems that do not perform adequately in real-world environments they are subject to poor detection rates and high false alarms rates in realistic, unstructured environments. At object video, automated surveillance system is strongly recommend that potential customers trial the technology in their own unique environments to determine the utility of this technology and its apt ability to environmental pressures. The automated video system is extremely effective as a turnkey system and in cases with unique environmental phenomena, automated surveillance system is rapidly adaptable to overcome operational concerns. The remote controlled mechatronics system is suitable for service sector units, mechanical, electrical and electronic industries and also useful in process industries for enhancement of control and monitoring of entire system.

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"HYBRID POWER GENERATION USING SOLAR PANEL AND WIND MILL"

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Abstract: Now a day's electricity is most needed facility for the human being. All the conventional energy resources are depleting day by day. So we have to shift from conventional to non-conventional energy resources. In this the combination of two energy resources is takes place i.e. wind and solar energy.
In this proposed system, we have designed a Advance Hybrid Inverter System. This System uses two Sources to charge battery.
We see many people using inverters these days which proves that its necessity has been increased in the current years. A Hybrid inverter is similar to a normal electric inverter but uses the energy from two different sources to charge battery such as Solar and Wind Energy.
An inverter helps in converting the direct current into alternate current with the help of solar power or Wind mill Power. Direct power is that power which runs in one direction inside the circuit and helps in supplying current when there is no electricity. Direct currents are used for small appliance like mobile e phones, MP3 players, IPod etc. where there is power stored in the form of battery. In case of alternative current it is the power that runs back and forth inside the circuit. The alternate power is generally used for house hold appliances. An inverter helps devices that run on DC power to run in AC power so that the user makes use of the AC power. If you are thinking why to use solar inverter instead of the normal electric one then it is because the solar one makes use of the solar energy which is available in abundant from the Sun and is clean and pollution free

1. INTRODUCTION

Hybrid Power Generation System using Wind and Solar Energy

Hybrid energy system is the combination of two energy sources for giving power to the load. In other word it can defined as "Energy system which is fabricated or designed to extract power by using two energy sources is called as the hybrid energy system." Hybrid energy system has good reliability, efficiency, less emission, and lower cost. In this proposed system solar and wind power is used for generating power. Solar and wind has good advantages than other than any other non-conventional energy sources. Both the energy sources have greater availability in all areas. It needs lower cost. There is no need to find special location to install this system.

A. Solar Energy

Solar energy is that energy which is gets by the radiation of the sun. Solar energy is present on the earth continuously and in abundant manner. Solar energy is freely available. It doesn't produce any gases that mean it is pollution free. It is affordable in cost. It has low maintenance cost. Only problem with solar system it cannot produce energy in bad weather condition. But it has greater efficiency than other energy sources. It only needs initial investment. It has long life span and has lower emission.

B. Wind Energy

Wind energy is the energy which is extracted from wind. For extraction we use wind mill. Ii is renewable energy sources. The wind energy needs less cost for generation of electricity. Maintenance cost is also less for wind energy system. Wind energy is present almost 24 hours of the day. It has less emission.
Initial cost is also less of the system. Generation of electricity from wind is depend upon the speed of wind flowing
A Hybrid energy system, or hybrid power, usually consists of two or more renewable energy sources used together to provide increased system efficiency as well as greater balance in energy supply.
The key to cost reductions of this order is, of course, the right sort of support for innovation and development - something that has been lacking for the past and, arguably, is still only patchy at present. Research and development efforts in solar, wind, and other renewable energy technologies are required to continue for:

- improving their performance,
- establishing techniques for accurately predicting their output
- reliably integrating them with other conventional generating sources

Advantages of Hybrid System
According to many renewable energy experts, a small "hybrid" electric system that combines home wind

electric and home solar electric (photovoltaic or PV) technologies offers several advantages over either single system.

In much of the United States, wind speeds are low in the summer when the sun shines brightest and longest. The wind is strong in the winter when less sunlight is available. Because the peak operating times for wind and solar systems occur at different times of the day and year, hybrid systems are more likely to produce power when you need it.

Many hybrid systems are stand-alone systems, which operate "off-grid" -- not connected to an electricity distribution system. For the times when neither the wind nor the solar system are producing, most hybrid systems provide power through batteries and/or an engine generator powered by conventional fuels, such as diesel. If the batteries run low, the engine generator can provide power and recharge the batteries. Adding an engine generator makes the system more complex, but modern electronic controllers can operate these systems automatically. An engine generator can also reduce the size of the other components needed for the system. Keep in mind that the storage capacity must be large enough to supply electrical

needs during non-charging periods. Battery banks are typically sized to supply the electric load for one to three days

2. LITERATURE REVIEW

General

The utilization of hybrid solar wind is necessity for today's scenario where pollution is increasing due to burning fossil fuels.

The different researches were carried out on the development and performance assessment of the solar and wind hybrid system.

Earlier Researches

Makbul A.M. Ramli [1] et.al, presented case study model on the hybrid solar and wind system on the techno-economic energy analysis for in Saudi Arabia.

Vikas Khare [2] et.al, presented the review on the HRES. The presented research concentrated on the different issues related with HRES such as optimum sizing, feasibility analysis, modeling, control aspects and reliability.

Y.M.Irwan [3] et.al, Asserted the new techniques in Perlis Malaysia for hybrid power generation.

Sunanda Sinha [4] et.al, presented the prospects for installation of micro wind and PV hybrid system in the Western Himalayas region. The analysis of the hybrid system is carried out on the basis data available from NASA and ANN predicted data, measured data for Hamirpur and estimated data for eleven locations of Himachal Pradesh.

Summary Of Literature Review

This system is combination of wind energy and solar energy, used to generate power from each other. Hybrid system is having advantage than system those which are totally depend on single source of energy. Researchers have very tough task to maximize the total energy output from the system with lower cost & reliability [8]. Generally wind-solar hybrid power system consists of wind turbines, photovoltaic array, controller and storage battery

3. METHODOLOGY

We see many people using inverters these days which proves that its necessity has been increased in the current years. A Hybrid inverter is similar to a normal electric inverter but uses the energy from two different sources to charge battery such as Solar and Wind Energy.

An inverter helps in converting the direct current into alternate current with the help of solar power or Wind mill Power. Direct power is that power which runs in one direction inside the circuit and helps in supplying current when there is no electricity. Direct currents are used for small appliance like mobile e phones, MP3 players, IPod etc. where there is power stored in the form of battery. In case of alternative current it is the power that runs back and forth inside the circuit. The alternate power is generally used for house hold appliances. An inverter helps devices that run on DC power to run in AC power so that the user makes use of the AC power. If you are thinking why to use solar inverter instead of the normal electric one then it is because the solar one makes use of the solar energy which is available in abundant from the Sun and is clean and pollution free.

This Project is designed as a 12V Portable and Compact Hybrid Inverter that will key away from darkness.

Solar Panel and Wind Mill is used to generate 12V DC Source. This Voltage is used to Charge 12V / 7 Ah Battery

In this proposed system, we have designed a Advance Hybrid Inverter System. This System uses two Sources to charge battery. Battery Voltage is further fed to Inverter Circuit, designed using Mosfet and CD4047 IC. This System is also equipped with Android based Load Control System. Android based Load System is designed using Arduino Microcontroller, Bluetooth Module and Relay Module as Major components. User can control Load within the average Range of 20-30 Feet Distance. LCD Module is used to display the Load control status.

In this Project Variable voltage of DC is taken through 12V / 3W Solar Panel and Wind Mill. This Voltage is given to the Charging Circuit using LM317; Output from LM317 is adjusted to 12V and given to 12V/7Ah Battery. Charged Battery Voltage is given to the Inverted Circuit. Inverter circuit consists of a stable Oscillator (CD4047). This IC Produces a Complementary Square Wave at Pin 10 and 11. Power Mosfet T1 and T2 are connected to output of CD4047 and it serve as drivers for the high-voltage generator, realized using step-up transformer. Here 9-0-9 Step down Transformer is connected in Reverse.

Output from Transformer is 230V which is connected to AC Load (Bulb) via a Dual Channel Relay. This Relay Module can be switched On / Off using Bluetooth Based Android Application.

4. BRIEF DESCRIPTION OF COMPONENTS

Solar Panel

Solar panel refers to a panel designed to absorb the sun's rays as a source of energy for generating electricity or heating.

A photovoltaic (in short PV) module is a packaged, connected assembly of typically 6×10 solar cells. Solar Photovoltaic panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications. Each module is rated by its DC output power under standard test conditions, and typically ranges from 100 to 365 watts. The efficiency of a module determines the area of a module given the same rated output – an 8% efficient 230 watt module will have twice the area of a 16% efficient 230 watt module. There are a few solar panels available that are exceeding 19% efficiency. A single solar module can produce only a limited amount of power; most installations contain multiple modules. A photovoltaic system typically includes a panel or an array of solar modules, a solar inverter, and sometimes a battery and/or solar tracker and interconnection wiring.

The price of solar power, together with batteries for storage, has continued to fall so that in many countries it is cheaper than ordinary fossil fuel electricity from the grid (there is "grid parity").

Efficiencies

See also: Solar cell efficiency

Depending on construction, photovoltaic modules can produce electricity from a range of frequencies of light, but usually cannot cover the entire solar range (specifically, ultraviolet, infrared and low or diffused light). Hence, much of the incident sunlight energy is wasted by solar modules, and they can give far higher efficiencies if illuminated with monochromatic light. Therefore, another design concept is to split the light into different wavelength ranges and direct the beams onto different cells tuned to those ranges.

This has been projected to be capable of raising efficiency by 50%. Scientists from Spectrolab, a subsidiary of Boeing, have reported development of multijunction solar cells with an efficiency of more than 40%, a new world record for solar photovoltaic cells.[2] The Spectrolab scientists also predict that concentrator solar cells could achieve efficiencies of more than 45% or even 50% in the future, with theoretical efficiencies being about 58% in cells with more than three junctions.

Currently the best achieved sunlight conversion rate (solar module efficiency) is around 21.5% in new commercial products[3] typically lower than the efficiencies of their cells in isolation. The most efficient mass-produced solar modules[disputed – discuss] have power density values of up to 175 W/m2 (16.22 W/ft2).[4] Research by Imperial College, London has shown that the efficiency of a solar panel can be improved by studding the light-receiving semiconductor surface with aluminum nanocylinders similar to the ridges on Lego blocks. The scattered light then travels along a longer path in the semiconductor which means that more photons can be absorbed and converted into current. Although these nanocylinders have been used previously (aluminum was preceded by gold and silver), the light scattering occurred in the near infrared region and visible light was absorbed strongly. Aluminum was found to have absorbed the ultraviolet part of the spectrum, while the visible and near infrared parts of the spectrum were found to be scattered by the aluminum surface. This, the research argued, could bring down the cost significantly and improve the efficiency as aluminum is more abundant and less costly than gold and silver. The research also noted that the increase in current makes thinner film solar panels technically feasible without

"compromising power conversion efficiencies, thus reducing material consumption".[5]

Efficiencies of solar panel can be calculated by MPP(Maximum power point) value of solar panels

Solar inverters convert the DC power to AC power by performing MPPT process: solar inverter samples the output Power(I-V curve) from the solar cell and applies the proper resistance (load) to solar cells to obtain maximum power.

MPP(Maximum power point) of the solar panel consists of MPP voltage(V mpp) and MPP current(I mpp): it is a capacity of the solar panel and the higher value can make higher MPP.

Micro-inverted solar panels are wired in parallel which produces more output than normal panels which are wired in series with the output of the series determined by the lowest performing panel (this is known as the "Christmas light effect"). Micro-inverters work independently so each panel contributes its maximum possible output given the available sunlight.

Applications

There are many practical applications for the use of solar panels or photovoltaics. It can first be used in agriculture as a power source for irrigation. In health care solar panels can be used to refrigerate medical supplies. It can also be used for infrastructure. PV modules are used in photovoltaic systems and include a large variety of electric devices:

- Photovoltaic power stations
- Rooftop solar PV systems
- Standalone PV systems
- Solar hybrid power systems
- Concentrated photovoltaics
- Solar planes
- Solar-pumped lasers
- Solar vehicles
- Solar panels on spacecrafts and space stations

5. RESULTS AND DISCUSSION

- Hybrid power generation is good and effective solution Hybrid power generation system is good and effective solution for power generation than conventional energy resources. It has greater efficiency. It can provide electricity without effecting the environment.
- So that the power can be utilize various purposes Cost reduction can be done by using the hybrid systems.
- People should motivate to use the non-conventional energy resources. It is highly safe for the environment as it doesn't produce any emission and harmful waste product like conventional energy resources. It is cost effective solution for generation.
- It only needs initial investment. It has also long-life span. Overall, it good, reliable and affordable solution for electricity generation.

6. CONCLUSION

The use of solar–wind hybrid renewable energy system is ever-increasing day by day and has shown incredible development in last few decades for electricity production all over the world. By using this development of new technologies and researches in the field of solar wind hybrid renewable energy system, a new difficulty arises, which become much more easily solved with new techniques. The presented review paper reported the different techniques and ideas about the HRES and its energy utilization.

Hybrid power generation system is good and effective solution for power generation than conventional energy resources. It has greater efficiency. It can provide to remote places where government is unable to reach. So that the power can be utilize where it generated so that it will reduce the transmission losses and cost. Cost reduction can be done by increasing the production of the equipment. People should motivate to use the non-conventional energy resources. It is highly safe for the environment as it doesn't produce any emission and harmful waste product like conventional energy resources. It is cost effective solution for generation. It only needs initial investment. It has also long-life span. Overall, it good, reliable and affordable solution for electricity generation.

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MONITORING OF INDUSTRIAL PARAMETERSBY USING ZIGBEE

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Abstract-CPS provides the necessary technological basis to facilitate the realization and corresponding automation of large-scale complex system, such as smart grids, smart buildings, smart transportation, smart healthcare and smart manufacturing, among other applications areas. The cps era is in need of solutions that will support it at device, system, and infrastructure and application level. This includes the whole lifecycle from cradle-to-grave of its cps components and services. This is a scientific, technical, industrial and social challenge that includes a multi-disciplinary engineering approach and the confluence and sometimes fusion of heterogeneous Communication, information and control/automation technologies. This work has presented an overview of key aspects related to industrial cps and key approaches and technologies associated with their engineering and implementation related to industrial automation, such as mas, soa and cloud systems. Based on the results of four European innovation projects (i.e. socrades, imc-aesop, grace and arum), the progress in the domain has been reported. subsequently, key challenges for the understanding and application of industrial automation based on cps technologies have been identified and some considerations on the difficulties and time horizon are discussed, with the aim to support further the increasing of the current technology readiness levels and lead to a broad utilization of cps-based systems and infrastructures in commercial industrial automation systems

1. TECHNOLOGYUSED

ZIGBEE

Zigbee modules feature a UART interface, which allows any microcontroller or microprocessor to immediately use the services of the Zigbee protocol. All a Zigbee hardware designer has to do in this as is ensure that the host's serial port logic levels are compatible with the XBee's 2.8- to3.4-V logic levels. The logic level conversion can be performed using either a standard RS-232 IC or logic level translators such as the 74LVTH125 when the host is directly connected to the XBeeUART.The below table gives the pin description of transceiver.

ZigbeeApplications

1. Manufacturing / Machining
2. Food
3. Metals
4. Power
5. Mining
6. Petrochemical / Chemical

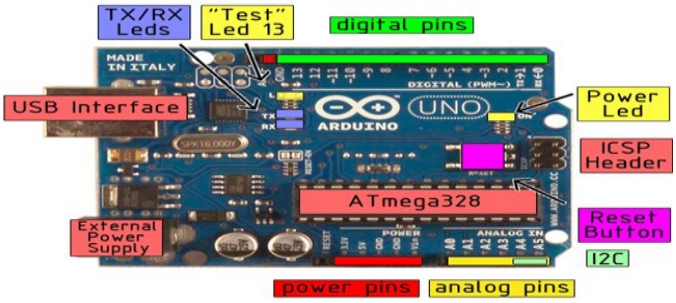
Embedded Systems

Examples of Embedded Systems :

- Avionics, such as inertial guidance systems, flight control hardware/software and other integrated systems in aircraft and missiles
- Cellular telephones and telephone switches
- Engine controllers and antilock brake controllers for automobiles
- Home automation products, such as thermostats, air conditioners, sprinklers, and security monitoring systems
- Handheld calculators

ARDUINO UNO (ATMEGA328P)

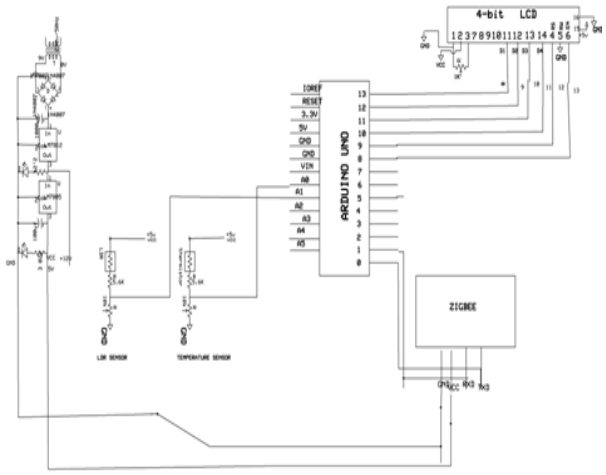
The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip



2. ADVANTAGESOFPROPOSEDSYSTEM:

1. Cost effective for controlling complex systems.
2. Flexible and can be reapplied to control other systems quickly and easily.
3. Trouble shooting aids make programming easier and reduce downtime.
4. Reliable components make these likely to operate for years before failure

FIGURE1ARCHITECTURALDIAGRAM



3. MODULEDESCRIPTION:

- DatasetCollectionModule
- TrainingtheModelWithAlgorithm
- Objectdetection
- Objecttracking
- Emailintegration

In this project we required operating voltage for ARDUINO controller board is 12V/5V. Hence the 12V D.C. power supply is needed for the ARDUINO board. This regulated 12V is generated by stepping down the voltage from 230V to 18V now the step downed a.c voltage is being rectified by the Bridge Rectifier using 1N4007 diodes. The rectified a.c voltage is now filtered using a 'C' filter. Now the rectified, filtered D.C. voltage is fed to the Voltage Regulator. This voltage regulator provides/allows us to have a Regulated constant Voltage which is of +12V. The rectified; filtered and regulated voltage is again filtered for ripples using an electrolytic capacitor100µF. Now the output from this section is fed to microcontroller board to supply operating voltage.

LCD is connected to 13, 12, 11, 10, 9, 8 pins
Temperature sensor is connected to A0
LDR sensor is connected to A2
ZIGBEE is connected 0 (rxd), 1 (txd) pins
Dc fan is connected to 6th pin
LED'S bunch is connected to 7th pin.

4. CONCLUSION

Zigbee provides all suitable data rates as compared to other wireless technology so this with stands suitably for such applications. This paper presents a system for measuring the power supply parameters using the Zigbee protocol for communicating with other elements. The device presented here in fulfils the objective of a power automation interconnected by Zigbee. So, Zigbee technology is completely suitable for the application in power monitoring system, and it can provide reliable protection for the operation of electric power systems.

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SMART ENERGY MATER USING GSM TECHNOLOGY

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Abstract-The advantages of remote meter reading and spot billing are well recognized by the various electricity boards in the country today. Not only does spot billing lead to much greater revenue-collection efficiency and better decision systems, it also brings intangibles like transparency and better customer service to the system. Though there exist various devices in the market that aid in spot-meter billing, none has become either an industry standard or widely prevalent. The reasons range from limited computing power and lack of customizability to high price and absence of local technical support.

Each consumer is provided with a unique energy meter, which is having a GSM modem, microcontroller unit and a display unit internally. A SIM card is required for communication. Whenever this system receives an SMS from electricity board, it calculates the number of units consumed and billing amount on slab rate, displays on LCD for user interface. This system also sends the same message to the electricity board for departmental information and database.

This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

1. INTRODUCTION

In the present system, Electricity bills are generated manually by personnel from the Electricity board. The Electricity board staff visit houses and commercial establishments, once a month and record the electricity consumption. Then based on the tariff the bill payment is done by the consumer.

The aim of the project is to automate the postpaid billing of energy meter. Wireless Control of Energy Meter is useful for billing purpose in Electricity board. Instead of going to every house & taking the readings, in this project by just sending a SMS electricity board can receive the readings of the house.

The amount of consumption is stored in memory authority as SMS. An SMS can be sent through Modem to that particular number which is assigned by these authorities and wait for the response. On other end the modem will receive the data in the form of a command and informs the controller to do the readings. After the readings the controller will send data to the modem.

Modem, in turn sends data to the other end. In the office the GSM unit will receive the data and software will calculate the total consumption. The number assigned by the authorities is unique. Using GSM we can get the response very fast due to which time is saved.

2. TECHNOLOGY USED

Artificial intelligence

Artificial Intelligence is: the field of study that describe the capability of machine learning just like humans and the ability to respond to certain behaviors also known as (A.I.). The need of Artificial Intelligence is increasing every day. Since AI was first introduced to the market, it has been the reason of the quick change in technology and business fields.

3. EMBEDDED SYSTEMS

An embedded system is a system which is going to do a predefined specified task is the embedded system and is even defined as combination of both software and hardware. A general-purpose definition of embedded systems is that they are devices used to control, monitor or assist the operation of equipment, machinery or plant. "Embedded" reflects the fact that they are an integral part of the system. At the other extreme a general-purpose computer may be used to control the operation of a large complex processing plant, and its presence will be obvious.

Applications of embedded systems

- Manufacturing and process control
- Construction industry
- Transport
- Buildings and premises
- Domestic service

Three basic characteristics differentiate microprocessors:

- **Instruction set**: The set of instructions that the microprocessor can execute.

- **Bandwidth:** The number of bits processed in a single instruction.
- **Clock speed:** Given in megahertz (MHz), the clock speed determines how many instructions per second the processor can execute.

In both cases, the higher the value, the more powerful the CPU. For example, a 32-bit microprocessor that runs at 50MHz is more powerful than a 16-bit microprocessor that runs at 25MHz. In addition to bandwidth and clock speed, microprocessors are classified as being either

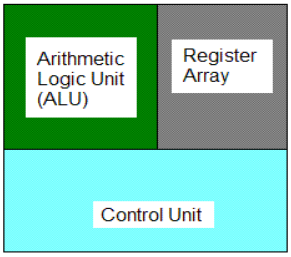


Fig: Three Basic Elements of a Microprocessor

Digital Signal Processors (DSPs):

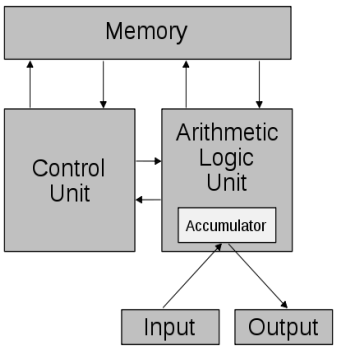
Digital Signal Processors is one which performs scientific and mathematical operation. Digital Signal Processor chips - specialized microprocessors with architectures designed specifically for the types of operations required in digital signal processing. Like a general-purpose microprocessor, a DSP is a programmable device, with its own native instruction code.

Harvard Architecture

Computers have separate memory areas for program instructions and data. There are two or more internal data buses, which allow simultaneous access to both instructions and data. The CPU fetches program instructions on the program memory bus.

Von-Neumann Architecture

A computer has a single, common memory space in which both program instructions and data are stored. There is a single internal data bus that fetches both instructions and data. They cannot be performed at the same time



Schematic of the Von-Neumann Architecture.

Schematic of the Von-Neumann Architecture.

Global System for Mobile:

Global System for Mobile (GSM) is a second generation cellular standard developed to cater voice services and data delivery using digital modulation.

Cellular is one of the fastest growing and most demanding telecommunications applications. Cellular systems using a digital technology will become the universal method of tele-communications.

Fig. GSM modem

GSM Specifications:

GSM 900

Mobile to Base Transceiver Station (uplink): 890-915 MHz

Base Transceiver Station to Mobile (downlink):935-960 MHz

Bandwidth: 2 * 25 MHz

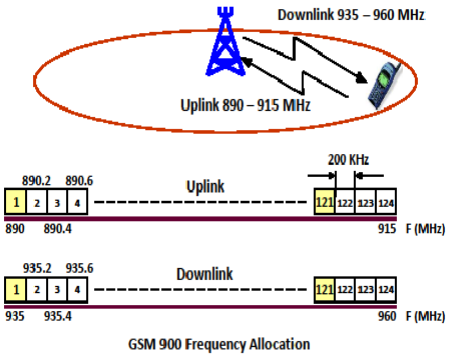


Fig GSM 900 frequency allocation

GSM-900 uses 890–915 MHz to send information from the mobile station to the base station (uplink) and 935–960 MHz for the other direction (downlink), providing 124 RF channels (channel numbers 1 to 124) spaced at 200 kHz.

SMS in GSM Network:

Short message service is a mechanism of delivery of short messages over the mobile networks. It is a store and forward way of transmitting messages to and from mobiles.

4. WORKING PRINCIPLE:

The Fig below shows a typical organization of network elements in a GSM network supporting SMS.

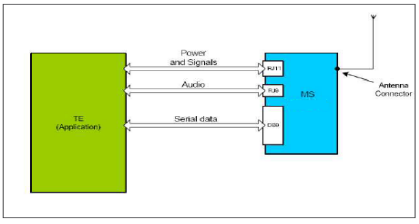
AT commands:

AT commands are used to operate the modem and have a broad range of Functions including:

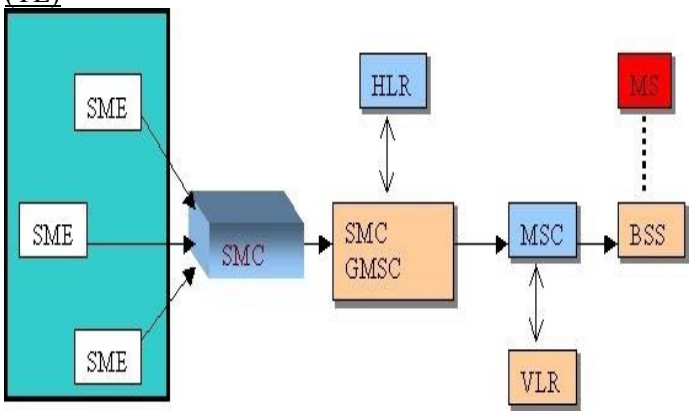
Configuring general parameters of the modem

- Setting up and controlling communications to and from the GSM Network
- Configuring the modem to communicate across the RS232 serial interface
- Obtaining GSM network status information.

The modem also supports the Voice, Data, Fax services but since these are not required for the current application, they are not taken into consideration as of now.



Interface between the GSM modem and microcontroller (TE)



General Syntax of AT-Commands:

Basic AT<command>
[=] [<parameter>]
Extended
AT+<command>= [<parameter>]
AT*<command>= [<parameter>]
Read command AT+<command>?
AT*<command>?
AT<command>?
Test command AT+<command>=?
AT*<command>=?
Response command
AT+<command> :<parameter>
AT*<command> :<parameter>

Important AT command used to Test and Design:

1) ATD to dial a voice call from the modem.
2) AT+IPR to set the baud rate for the modem (here for our application the baud rate is
Set as 9600)
3) ATA to answer an incoming call.
4) AT+CHUP to hang up the initiated call.
5) AT+CFUN to set the phone functionality. Set to 0 to deactivate the modem.
6) AT+CLIP to identify caller number this command is set to 1
7) AT+CLIR for calling line Identification Restriction.
8) AT+CNUM to identify the subscriber number.
9) AT+CMGR to read the message at particular location .The location number is given
as index.
10) AT+CMGD to delete the received message
11) AT+CMGS to send the message.
12) AT+CMGF to change the message format to PDU or Text mode.
13) AT+CMGL to see all the list of messages.
14) ATE to enable and disable command echo.

SMS Applications

Exchanging small messages like "See you at 8.30 tonight at xyz". SMS is particularly suited for these kinds of short messages because SMS is much cheaper than calling someone and giving the same message.

Fig Main components in SMS operation

The SMC (Short Message Center) is the entity which does the job of store and forward of messages to and from the mobile station. The SME (Short Message Entity) which can be located in the fixed network or a mobile station, receives and sends short messages.

5. CONCLUSION:

In this paper, we have studied and implemented a complete working model using a Microcontroller. The programming and interfacing of microcontroller has been mastered during the implementation. This work includes the study of GSM modem

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ENERGY THEFT DETECTION WITH DIGITAL PROTECTIVE RELAY DEPLOYMENT

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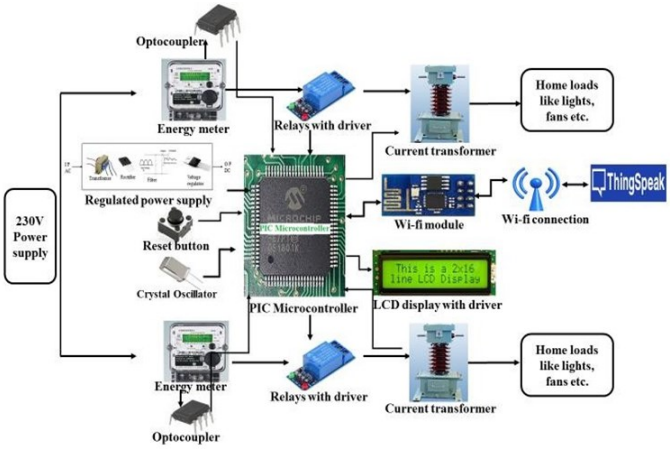
ABSTRACT: The main purpose of the project is to develop a system to detect the power theft in multi-tenantand send the data to thingspeak through internet.The PIC microcontroller controls the whole project. The project main aim to control thepower theft and supply power to multi tenants through one supply. Here to themicro controller wo tenants areconnected.Interfacing the Wi-Fi module, liquid crystal display, buzzer, and meter pulse using PICmicrocontroller, here providing 5v to activate and then it displays the IP address which needsto connect the Wi-Fi module to send the data to processor or controller.An optocoupler-isolated power supply is often the safest and most practical way to go when it comes toperformance and protection, it is connected to energy meter. Energy meter will read the pulseto calculate the amount of consumed power. Loadtakes5vpowerfromthepowertransformer.Thedatawill besenttothingspeak through wi-fi module connected to microcontroller. These smart meters will betwo blocks corresponding to multiple tenants and those respective meter readings will beuploadedto thingspeak through cloud.

1. PROBLEM DEFINITION

An embedded system is a combination of software and hardware to perform dedicated task.Someofthemaindevicesusedinembeddedproductsare MicroprocessorsandMicrocontrollers.Microprocessorsare commonlyreferredtoas general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller notonlyacceptsthedataasinputsbutalsomanipulatesit,interfacesthedatawithvariousdevices,controlsthedataandthusfinallygivestheresult.Theproject"EnergyTheftDetection in Multi-Tenant Data Centers with Digital Protective Relay Deployment" usingPIC16F73 Microcontroller is an exclusive project that can detect the power theft in multi-tenantand send the data to thingspeak through internet.

2. BLOCK DIAGRAM



EmbeddedSystems

An embedded system is a computer system designed to perform one or a few dedicatedfunctions often with real-time computing constraints. It is embedded as part of a completedeviceoftenincludinghardwareandmechanicalparts.Bycontrast,ageneral-purposecomputer, such as a personal computer (PC), is designed to be flexible and to meet a widerangeof end-user needs.Embedded systemscontrol manydevices incommon usetoday.

3. HARDWARE DESCRIPTION

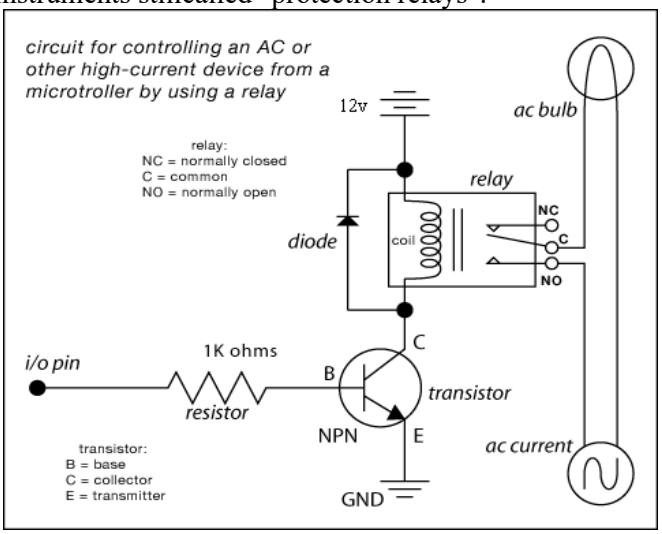
MicrocontrollerPIC16F73

The PIC16F73 CMOS FLASH-based 8-bit microcontroller is upward compatible with

thePIC16C73B/74B/76/77,
PIC16F873/874/876/877devices. It features 200 ns instructionexecution, self programming, an ICD, 2 Comparators, 8 channels of 8-bit Analog-to-Digital(A/D) converter, 2 capture/compare/PWM functions, a synchronous serial port that can beconfiguredaseither 3-wireSPIor 2-wire I2C bus,aUSART,and aParallel SlavePort.
High-PerformanceRISCCPU
Only35singlewordinstructionstolearn
Allsinglecycleinstructionsexceptforprogram branchesswhicharetwo-cycle
Operatingspeed:DC -20MHzclockinput
DC-200ns instructioncycle
Upto8Kx 14wordsofFLASHProgram Memory,Upto 368x8 bytesofData Memory(RAM)
PinoutcompatibletothePIC16C73B/74B/76/77
AnalogComparatormodule
2analogcomparators
Programmableon-chipvoltagereferencemodule
ProgrammableinputmultiplexingfromdeviceinputsandinternalVREF
Comparatoroutputsareexternallyaccessible
Program memory(FLASH) isused forstoring awritten program.
SincememorymadeinFLASHtechnologycanbe programmedandclearedmorethanonce,itmakes this microcontroller suitablefordevicedevelopment.
EEPROM data memory that needs to be saved when there is no supply.It is usuallyused for storing important data that must not be lost if power supply suddenly stops. Forinstance, one such data is an assigned temperature in temperature regulators. If during a lossof power supplythis data was lost, we would have to make the adjustment once again uponreturnofsupply. Thus our devicelooses on self-reliance.

RAM - Data memory used by a program during its execution.In RAM are stored allinter-resultsor temporarydata during run-time.
PORTS are physical connections between the microcontroller and the outside world.PIC16F73has 22I/O.
FREE-RUN TIMER is an 8-bit register inside a microcontroller that worksindependently of the program. On every fourth clock of the oscillator it increments its valueuntil it reaches the maximum (255), and then it starts counting over again from zero. As weknow the exact timing between each two increments of the timer contents, timer can be usedformeasuring time whichveryuseful with somedevices.

CENTRAL PROCESSING UNIT has a role of connective element between otherblocks in the microcontroller. It coordinates the work of other blocks and executes the userprogram.
Relay
A relay is an electrically operated switch. Many relays use an electromagnet to operate aswitching mechanism, but other operating principles are also used. Relays find applicationswhere it is necessary to control a circuit by a low-power signal, or where several circuits mustbe controlled by one signal. The first relays were used in long distance telegraph circuits,repeating the signal coming in from one circuit and re-transmitting it to another. Relays foundextensive use in telephone exchanges and early computers to perform logical operations. Atype of relay that can handle the high power required to directly drive an electric motor iscalled a contactor. Solid-state relays control power circuits with no moving parts, insteadusing a semiconductor device triggered by light to perform switching. Relays with calibratedoperating characteristics and sometimes multiple operating coils are used to protect electricalcircuitsfromoverloadorfaults;inmodernelectricpowersystemsthesefunctionsareperformedbydigital instruments stillcalled "protection relays".



4. ADVANTAGES AND DISADVANTAGES

Advantages

- Real-timePowermonitoringsystem.
- Sensingthe powertheftusingmeterpulsesensor.
- Itreducesmonetarycostofthe electricityconsumption.
- By usingthiswecandetectthepowertheft.
- DatamonitoringusingIOTtechnologyitswork fromanywhereintheworld.

- Lowcost.
- Efficiencydesign.
- Lowpowerconsumption.

Disadvantages

- Interfacingenergymeterwithmicrocontrollerishighlysensitive

APPLICATIONS

- Commercialplaces.
- Webapplications.

5. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presenceof every module has been reasoned out and placed carefully, thus contributing to the bestworkingoftheunit.Secondly,usinghighlyadvancedIC' swiththehelpofgrowingtechnology,theproject has beensuccessfullyimplemented.Thustheprojecthasbeensuccessfullydesignedand tested.

6. RESULT AND DISCUSSION

Thepaper"EnergyTheftDetection withDigitalProtectiveRelay Deployment" was designed such that to detect the power theft in multi-tenantand sendthe data to thingspeak through internet.

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DESIGN & IMPLEMENTATION OF CONVOLUTION NEURAL NETWORKS

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Abstract- Full end-to-end text recognition in natural images is a challenging problem that has received much atten- tion recently. Traditional systems in this area have re- lied on elaborate models incorporating carefully hand engineered features or large amounts of prior knowl- edge. In this paper, we take another method and combine the representative power of large, multilayer neural networks together with recent developments in unsupervised feature learning, which allows us to use a common framework to train highly-accurate text detec- tor and character recognizer modules. Then, using only simple off-the-shelf methods, we integrate these two modules into a full end-to-end, lexicon-driven, scene text recognition system that achieves state-of-the-art performance on standard benchmarks, and popular streets

1 INTRODUCTION

Extracting textual information from natural images is a challenging problem with many practical applica- tions. Unlike character recognition for scanned docu- ments, recognizing text in unconstrained images is com- plicated by a wide range of variations in backgrounds, textures, fonts, and lighting conditions. As a result, many text detection and recognition systems rely on cleverly hand-engineered features [5, 4, 14] to repre- sent the underlying data. Sophisticated models such as conditional random fields [11, 19] or pictorial structures [18] are also often required to combine the raw detec- tion/recognition outputs into a complete system.

In this paper, we attack the problem from a differ- ent angle. For low-level data representation, we use an unsupervised feature learning algorithm that can auto- matically extract features from the given data. Such algorithms have enjoyed numerous successes in many

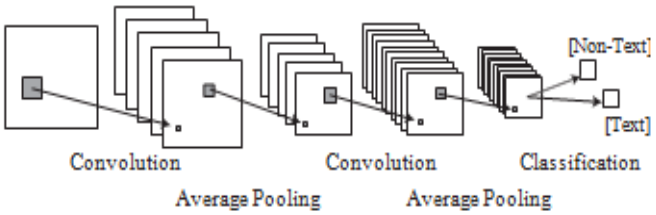

Figure 1. CNN used for text detection.

related fields such as visual recognition [3] and action recognition [7]. In the case of text recognition, the system in [2] achieves competitive results in both text detection and character recognition using a simple and scalable feature learning architecture incorporating very little hand-engineering and prior knowledge.

We integrate these learned features into a large, discriminatively-trained convolutional neural network (CNN). CNNs have enjoyed many successes in simi- lar problems such as handwriting recognition [8], visual object recognition [1], and character recognition [16]. By leveraging the representational power of these net- works, we are able to train highly accurate text detection and character recognition modules. Using these mod- ules, we can build an end-to-end system with only sim- ple post-processing techniques like non-maximal sup- pression (NMS)[13] and beam search [15]. Despite its simplicity, our system achieves state-of-the-art perfor- mance on standard test sets.

2 LEARNING ARCHITECTURE

In this section, we describe our text detector and character recognizer modules, which are the essential building blocks of our full end-to-end system. Given a 32-by-32 pixel window, the detector decides whether the window contains a centered character. Similarly, the recognizer decides which of 62 characters (26 upper- case, 26 lowercase letters, and 10 digits) is in the win- dow. As described at length in Section 3, we slide the

Figure 2. Examples from our training set.
Left: from ICDAR. Right: synthetic data

detector across a full scene image to identify candidate lines of text, on which we perform word-level segmentation and recognition to obtain the end-to-end results.

For both detection and recognition, we use a multi- layer, convolutional neural network (CNN) similar to [8, 16]. Our networks have two convolutional layers

for detection with n1 = 96 and n2 = 256 is shown in with n1 and n2 filters respectively. The network we use (n1 = 115 and n2 = 720) is used for recognition. Figure 1, while a larger, but structurally identical one

We train the first layer of the network with an unsupervised learning algorithm similar to [2, 3]. In particular, given a set of 32-by-32 grayscale training images1 as illustrated in Figure 2, we randomly extract

ZCA whitened [6] to form input vectors x(i) ∈ R64, i ∈ m 8-by-8 patches, which are contrast normalized and {1, ..., m}. We then use the variant of K-means described in [2] to learn a set of low-level filters D ∈ R64×n1 . For a single normalized and whitened 8-by-8 patch x, we compute its first layer responses z by per- a scalar activation function: z = max{0, |DTx| − α}, where α = 0.5 is a hyperparameter. forming inner product with the filter bank followed by

Given a 32-by-32 input image, we compute z for every 8-by-8 sub-window to obtain a 25-by-25-by-n1 first layer response map. As is common in CNNs, we average pool over the first layer response map to bring its dimensions to 5-by-5-by-n1. We stack another convolution and average pooling layer on top of the first layer to obtain a 2-by-2-by-n second layer response map.

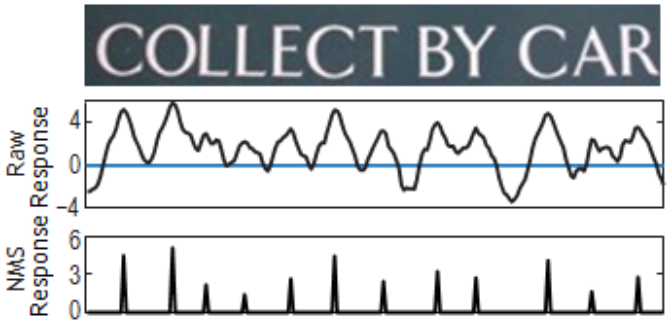

Figure 3. Detector responses in a line.

3 END-TO-END PIPELINE INTEGRATION

Our full end-to-end system combines a lexicon with our detection/recognition modules using post- processing techniques including NMS and beam search. Here we assume that we are given a lexicon (a list of tens to hundreds of candidate words) for a particular im- age. As argued in [18], this is often a valid assumption as we can use prior knowledge to constrain the search to just certain words in many applications. The pipeline mainly involves the following two stages:

(i) We run sliding window detection over high resolution input images to obtain a set of candidate lines of text. Using these detector responses, we also estimate locations for the spaces in the line.

(ii) We integrate the character responses with the can- didate spacings using beam search [15] to obtain full end-to-end results.

First, given an input image, we identify horizontal lines of text using multiscale, sliding window detec- tion. At each scale s, we evaluate the detector response

Rs[x, y] at each point (x, y) in the scaled image. As acters at the right scale produce positive Rs[x, y]. We apply NMS [13] to Rs[x, r] in each individual row r to shown in Figure 3, windows centered on single char- estimate the character locations on a horizontal line. In particular, we define the NMS response

These outputs are fully connected to the classification layer. We discriminatively train the network by back-propagating the L2-SVM classification error,2 but we fix the filters in the first convolution layer (learned from K-means). Given the size of the networks, fine-tuning is performed using multiple GPUs.

non-zero R˜s[x, r], we form a line-level bounding box where δ is some width parameter. For a row r with Lr with the same height as the sliding window at scale s. The left and right boundaries of Lr are defined as min(x) and max(x), s.t. R˜s[x, r] > 0. This yields a

1Our dataset consists of examples from the ICDAR 2003 train- ing images [10], the English subset of the Chars74k dataset [4], and synthetically generated examples.

2In the form of a squared hinge loss: max{0, 1 − θTx}2 .

set of possibly overlapping line-level bounding boxes. We score each box by averaging the nonzero values of R˜s[x, r]. We then apply standard NMS to remove all L's that overlaps by more than 50% with another box

bounding boxes L˜. Since gaps between words produce of a higher score, and obtain the final set of line-level sharply negative responses, we also estimate possible space locations within each Lr by applying the same NMS technique as above to the negative responses.

After identifying the horizontal lines of text, we jointly segment the lines of text into words and recog- nize each word in the line. Given a line-level bounding box L and its candidate space locations, we evaluate a number of possible word-level bounding boxes using a Viterbi-style algorithm and find the best segmentation scheme using a beam search technique similar to [9].

character recognizer across it and obtain a 62 × N score

To evaluate a word-level bounding box B, we slide the matrix M , where N is the number of sliding windows

M (i, j) suggests a higher chance that the character with within the bounding box. Intuitively, a more positive index i is centered on the location of the jth window.

Similar to the detection phase, we perform NMS over

to be present. The other columns of M are set to −∞. M

to select the columns where a character is most likely

We then find the lexicon word w∗ that best matches a

score matrix M as follows: given a lexicon word w, compute the alignment score

Table 1. Cropped word recognition accu- racies on ICDAR 2003 and SVT

Benchmark	I-WD-50	I-WD	SVT-WD
Our approach	90%	84%	70%
Wang, *et al*. [18]	76%	62%	57%
Mishra, *et al*. [11]	82%	-	73%

4 EXPERIMENTAL RESULTS

In this section we present a detailed evaluation of our text recognition pipeline. We measure cropped character and word recognition accuracies, as well as end-to-end text recognition performance of our system on the ICDAR 2003 [10] and the Street View Text (SVT) [18] datasets. Apart from that, we also perform additional analysis to evaluate the importance of model size on different stages of the pipeline.

First we evaluate our character recognizer module on the ICDAR 2003 dataset. Our 62-way character classifier achieves state-of-the-art accuracy of 83.9% on cropped characters from the ICDAR 2003 test set. The best known previous result on the same benchmark is 81.7% reported by [2]

Our word recognition sub-system is evaluated on images of perfectly cropped words from the ICDAR 2003 and SVT datasets. We use the exact same test setup as [18]. More concretely, we measure word-level accu-

where lw is the alignment vector3 between the characters in w and the columns of M . Sw

racy with a lexicon containing all the words from the

can be com-

ICDAR test set (called I-WD), and with lexicons con-

puted efficiently using a Viterbi-style alignment algo-

sisting of the ground truth words for that image plus

rithm similar to [17].4 We compute Sw

for all lexicon

50 random “distractor” words added from the test set

the highest scoring word w∗. We take SB = Sw to be

words and label the word-level bounding-box B with the recognition score of B.

Having defined the recognition score for a single bounding box, we can now systematically evaluate possible word-level segmentations using beam search [15], a variant of breadth first search that explores the top N possible partial segmentations according to some heuristic score. In our case, the heuristic score of a candidate segmentation is the sum of the SB’s over all the resulting bounding boxes in a line of text L. In order to deal with possible false positives from the text detection stage, we threshold individual segments based on their recognition scores. In that way, segments with low recognition scores are pruned out as being “non-text.”

3For example, lw = 6 means the 4th character in w aligns with the 6th column of M , or the 6th sliding window in a line of text.

4In practice, we also augment Sw with additional terms that en- courage geometric consistency. For example, we penalize character spacings that are either too narrow or vary a lot within a single word.

(called I-WD-50). For the SVT dataset, we used the provided lexicons to evaluate the accuracy (called SVT-WD). Table 1 compares our results with [18] and the very recent work of [11].

We evaluate our final end-to-end system on both the ICDAR 2003 and SVT datasets, where we locate and recognize words in full scene images given a lexicon. For the SVT dataset, we use the provided lexicons; for the ICDAR 2003 dataset, we used lexicons of 5, 20 and 50 distractor words provided by the authors of [18], as well as the “FULL” lexicon consisting of all words in the test set. We call these benchmarks I-5, I-20, I-50 and I-FULL respectively. Like [18], we only consider alphanumeric words with at least 3 characters. Figure 5 shows some sample outputs of our system. We fol- low the standard evaluation criterion described in [10] to compute the precision and recall. Figure 4 shows precision and recall plots for the different benchmarks on the ICDAR 2003 dataset.

As a standard way of summarizing results, we also

Figure 5. Example output bounding boxes of our end-to-end system on I-FULL and SVT bench- marks. Green: correct detections. Red: false positives. Blue: misses.

Table 2. F-scores from end-to-end evalua- tion on ICDAR 2003 and SVT datasets.

Benchmark	I-5	I-20	I-50	I-FULL	SVT
Our approach	.76	.74	.72	.67	.46
Wang, *et al*. [18]	.72	.70	.68	.51	.38

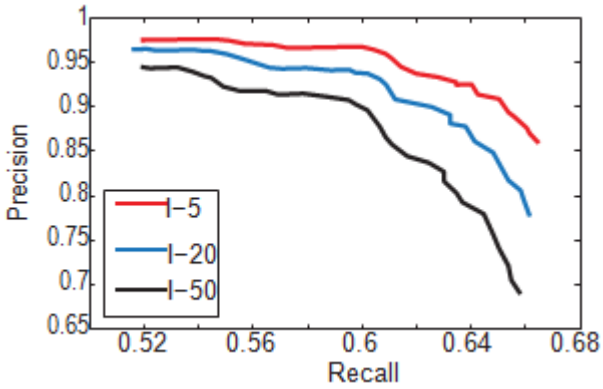

Figure 4. End-to-end PR curves on ICDAR 2003 dataset using lexicons with 5, 20, and 50 distractor words.

report the highest F-scores over the PR curves and compare with [18] in Table 2. Our system achieves higher F-scores in every case. Moreover, the margin of improvement is much higher on the harder benchmarks (0.16 for I-FULL and 0.08 for SVT), suggesting that our system is robust in more general settings.

In addition to settings with a known lexicon, we also extend our system to the more general setting by using a large lexicon L of common words. Since it is infea- sible to search over all words in this case, we limit our search to a small subset P ∈ L of "visually plausible" words. We first perform NMS on the score matrix M across positions and character classes, and then threshold it with different values to obtain a set of raw strings. The raw strings are fed into Hunspell5 to yield a set of suggested words as our smaller lexicon P , Using this simple setup, we achieve scores of 0.54/0.30/0.38 (precision/recall/F-score) on the ICDAR dataset. This 5Hunspell is an open source spell checking software available at http://hunspell.sourceforge.net/. We augment its default lexicon with a corpus of English proper names to better handle text in scenes.

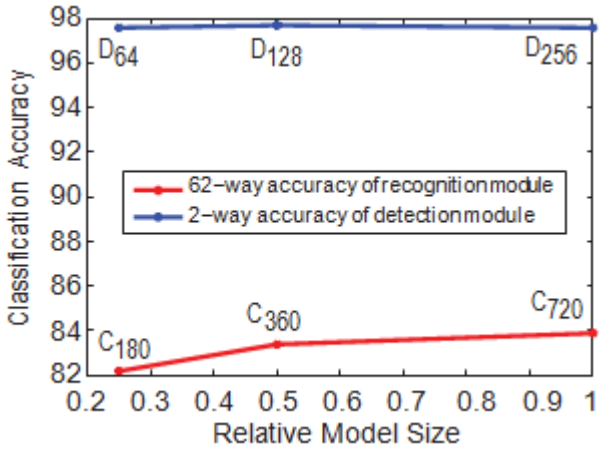

Figure 6. Accuracies of the detection and recognition modules on cropped patches

is comparable to the best known result 0.42/0.39/0.40 obtained with a general lexicon by [14].

In order to analyze the impact of model size on different stages of the pipeline, we also train detection and tional filters. The detection modules have n2 = 64 and recognition modules with fewer second layer convolu- 128 compared to 256 in our full model. We call the detection modules D64, D128 and D256 respectively. Similarly, we call the recognition modules C180, C360 and C720, which corresponds to n2 = 180, 360 and 720. The smaller models have about 1/4 and 1/2 number of learnable parameters compared to the full models.

To evaluate the performance of the detection mod-

Table 3. Classification and end-to-end re- sults of different recognition modules

Recognition module	C_{180}	C_{360}	C_{720}
Classification accuracy	82.2%	83.4%	83.9%
End-to-end F-score	.6330	.6333	.6723

ules, we construct a 2-way (character vs. non-character) classification dataset by cropping patches from the ICDAR test images. The recognition modules are evaluated on cropped characters only. As shown in Fig- ure 6, the 62-way classification accuracy increases as model size gets larger, while the 2-way classification re- sults remain unchanged. This suggests that larger model sizes yield better recognition modules, but not necessar- ily better detection modules.

Finally, we evaluate the the 3 different recognition modules on the I-FULL benchmark, with D256 as the detector for all 3 cases. The end-to-end F-scores are listed against the respective classification accuracies in Table 3. The results suggests that higher character classification accuracy does give rise to better end-to-end

results. This trend is consistent with the findings of [12] on house number recognition in natural images.

5 CONCLUSION

In this paper, we have considered a novel approach for end-to-end text recognition. By leveraging large, multi-layer CNNs, we train powerful and robust text detection and recognition modules. Because of this increase in representational power, we are able to use simple non-maximal suppression and beam search tech- niques to construct a complete system. This represents a departure from previous systems which have gener- ally relied on intricate graphical models or elaborately hand-engineered systems. As evidence of the power of this approach, we have demonstrated state-of-the- art results in character recognition as well as lexicon- driven cropped word recognition and end-to-end recog- nition. Even more, we can easily extend our model to the general-purpose setting by leveraging conventional open-source spell checkers and in doing so, achieve per-formance comparable to state-of-the-art.

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TRUST MANAGEMENT SCHEME FOR CLUSTERED WIRELESS SENSOR NETWORKS

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Abstract— In this work, we propose a new lightweight Group- based Trust Management Scheme (GTMS) for wireless sensor networks, which employs clustering. Our approach reduces the cost of trust evaluation. Also, theoretical as well as simulation results show that our scheme demands less memory, energy, and communication overheads as compared to the current state-of-the-art trust management schemes and it is more suitable for large-scale sensor networks. Traditional trust management schemes developed for wired and wireless ad hoc networks are not well suited for sensor networks due to their higher consumption of resources such as memory and power. Furthermore, GTMS also enables us to detect and prevent malicious, selfish, and faulty nodes.
Index Terms—Trust evaluation, trust modeling, trust management, security, sensor networks.

1 INTRODUCTION

RUST in general is the level of confidence in a person or a thing. Various engineering models such as security, usability, reliability, availability, safety, and privacy models incorporate some limited aspects of trust with different meanings [1]. For example, in sensor network security, trust is a level of assurance about a key's authenticity that would be provided by some centralized trusted body to the sensor node (SN) [2], [3]. In wireless ad hoc and sensor network reliability, trust is used as a measure of node's competence in providing required service [4], [5], [6], [7]. In general, establishing trust in a network gives many benefits such as the following:

1. Trust solves the problem of providing correspond- ing access control based on judging the quality of SNs and their services. This problem cannot be solved through traditional security mechanisms [8].
2. Trust solves the problem of providing reliable routing paths that do not contain any malicious, selfish, or faulty node(s) [9], [10].
3. Trust makes the traditional security services more robust and reliable by ensuring that all the communicating nodes are trusted during authentication, authorization, or key management [11].

For Wireless Sensor Networks (WSNs), we visualize that trust management is a cooperative business rather than an individual task due to the use of clustering schemes such as LEACH [12], PEGASIS [13], TEEN [14], and HEED [15] in real-world scenarios. Moreover, SNs can also be deployed in the form of groups [16], which are willing to collaborate with each other in order to process, aggregate, and forward collected data [17]. This highlights the fact that these clustering schemes and group deployments enable SNs to fulfill their responsibilities in a cooperative manner rather than individually. Therefore, establishing and managing trust in a cooperative manner in clustering environment provides many advantages. Such as, within the cluster, it helps in the selection of trusted cluster head by the member nodes. Similarly, the cluster head will be able to detect faulty or malicious node(s). In case of multihop clustering [15], [18], it helps to select trusted en route nodes through which a node can send data to the cluster head. During intercluster communication, trust management helps to select trusted en route gateway nodes or other trusted cluster heads through which the sender node will forward data to the base station (BS).

A number of trust management schemes have been proposed for peer-to-peer networks [19], [20], [21] and ad hoc networks [22], [5], [23]. To the best of our knowl- edge, very few comprehensive trust management schemes (e.g., Reputation-based Framework for Sensor Networks (RFSN) [24], Agent-based Trust and Reputation Manage- ment (ATRM) [25], and Parameterized and Localized trUst management Scheme (PLUS) [26]) have been proposed for sensor networks. Although, there are some other works available in the literature, e.g., [6], [7], [27], [28], and so forth, that discuss trust but not in much detail. Within such comprehensive works, only ATRM [25] scheme is specifi- cally developed for the clustered WSNs. However, this and other schemes suffer from various

limitations such as these schemes do not meet the resource constraint requirements of the WSNs and, more specifically, for the large-scale WSNs. Also, these schemes suffer from higher cost associated with trust evaluation specially of distant nodes. Furthermore, existing schemes have some other limitations such as dependence on specific routing scheme, like PLUS works on the top of the PLUS_R routing scheme; dependence on specific platform, like the ATRM scheme requiresan agent-based platform; and unrealistic assumptions, like the ATRM assumes that agents are resilient against any security threats, and so forth. Therefore, these works are not well suited for realistic WSN applications. Thus, a light- weight secure trust management scheme is needed to address these issues.

In this work, we propose a new lightweight Group-based Trust Management Scheme (GTMS) for clustered WSNs. The GTMS consists of three unique features such as

- GTMS evaluates the trust of a group of SNs in contrast to traditional trust management schemes that always focus on trust values of individual nodes. This approach gives us the benefit of requiring less memory to store trust records at each SN in the network.
- GTMS works on two topologies: intragroup topol-

ogy where distributed trust management approach is used and intergroup topology where centralized trust management approach is adopted. This meth- odology helps to drastically reduce the cost asso- ciated with trust evaluation of distant nodes.

- GTMS not only provides a mechanism to detect malicious nodes but also provides some degree of prevention mechanism.

These and other specific features (e.g., independent of any specific routing scheme and platform and so forth) collectively make the GTMS a new, lightweight, flexible, and robust solution that can be used in any clustered WSNs. The rest of this paper is organized as follows: Section 2 describes related work. Section 3 contains definitions, description on representation of trust value, and assump- tions. Section 4 proposes trust modeling and evaluation mechanism of the GTMS. Sections 5 and 6 provide theoretical and simulation-based analysis and evaluation of the GTMS, respectively. Section 7 concludes this paper

and suggests some future directions.

2 RELATED WORK

Research work on trust management schemes for WSNs is in its infancy. To our knowledge, very few trust manage- ment schemes have been proposed such as RFSN [24], ATRM [25], and PLUS [26]. Although, there are some other works available in the literature, e.g., [6], [7], [27], [28] and so forth, that discuss trust but not in much great detail.

Ganeriwal and Srivastava [24] proposed RFSN, where each SN maintains the reputation for neighboring nodes only. Trust values are calculated on the basis of that reputation and they use Bayesian formulation for represent- ing reputation of a node. RFSN assumes that the node has enough interactions with the neighbors so that the reputa- tion (beta distribution) can reach a stationary state. However, if the rate of node mobility is higher, reputation information will not stabilize. In RFSN, no node is allowed to disseminate bad reputation information. If it is assumed that "bad" reputation is implicitly included by not giving out good reputation, then in that case, the scheme will not be able to cope with uncertain situations [28].

Boukerche et al. [25] have proposed an ATRM scheme for WSNs. ATRM is based on a clustered WSN and calculates trust in a fully distributed manner. ATRM works on specific agent-based platform. Also, it assumes that there is a single trusted authority, which is responsible for generating and launching mobile agents, which makes it vulnerable against a single point of failure. ATRM also assumes that mobile agents are resilient against malicious nodes that try to steal or modify information carried by the agent. In many applications, this assumption may not be realistic.

Yao et al. [26] have proposed PLUS for sensor network security. The authors adopt a localized distributed ap- proach and trust is calculated based on either direct or indirect observations. This scheme works on top of their own defined routing scheme called PLUS_R. In this scheme, the authors assume that all the important control packets generated by the BS must contain a hashed sequence number (HSN). Inclusion of HSN in control packets not only increases the size of packets resulting in higher consumption of transmission and reception power but also increases the computational cost at the SNs. Also, whenever a judge node receives a packet from another node i, it will always check the integrity of the packet. If the integrity check fails, then the trust value of node i will be decreased irrespective of whether node i was really involved in maliciously making some modification in a packet or not. So, node i may get unfair penalty.

3 DEFINITIONS, REPRESENTATION, AND ASSUMPTIONS

3.1 Definitions

Our proposed GTMS calculates the trust value based on direct or indirect observations. Direct observations represent the number of successful and unsuccessful interactions and indirect observations represent the recommendations of trusted peers about a specific node. Here, interaction means the cooperation of two nodes. For example, a sender will consider an interaction as successful if the sender receives an assurance that the packet is successfully received by the neighbor node and that node has forwarded the packet toward the destination in an unaltered fashion. Thus

- The first requirement, i.e., successful reception, is achieved on reception of the link layer acknowl- edgment (ACK). IEEE 802.11 is a standard link layer protocol, which keeps packets in its cache until the sender receives an ACK. Whenever the receiver node successfully received the packet, it will send back an ACK to the sender. If the sender node did not receive the ACK during a predefined threshold time, then it will retransmit that packet.
- The second requirement, i.e., forwarding of the packet, is achieved by using enhanced passive acknowledgment (PACK) by overhearing the trans- mission of a next hop on the route, since they are within the radio range [10].

If the sender node does not overhear the retransmission of the packet within a threshold time from its neighboring node or the overheard packet is found to be illegally fabricated (by comparing the payload that is attached to the packet), then the sender node will consider that interaction as an unsuccessful one. If the number of unsuccessful interactions increases, the sender node decreases the trust value of that neighboring node and may consider it as a faulty or malicious node.

3.2 Representation of Trust Value

Generally, a trust value is considered to be a numerical quantity lying between 0 and 1 (inclusive) as suggested earlier in [5], [22], and [29] or between 1 and 1 (inclusive) as described in [4] on a real number line. In this paper, we use trust value as an integer in the interval between 0 and 100 (inclusive). However, other ranges, for example base 2 ranges, could be used as well. Although presenting the trust values as a real number or integer may not play an important role in traditional networks, but for SNs this issue is of critical importance due to limited memory, and transmission, reception power. This change will give us benefits such as: Representation of trust value [0, 100] as an unsigned integer (1 byte) saves 75 percent of memory space as compared to trust values represented as a real number (4 bytes). Less number of bits need to be transmitted during the exchange of trust values between SNs. This gives us the benefit of less consumption of transmission and reception power.

3.3 Assumptions

We assume that the sensor network consists of large number of SNs that are deployed in an open or hostile environment. We also assume that all SNs have unique identities as it is also assumed in [24], [25], and [30]. In some of the sensor network models, nodes do not have unique identities like IP in traditional networks. However, in order to uniquely identify the SNs and perform communication in those environments, class-based addressing scheme [31], [32], [33] is used, in which a node is identified by a triplet

4 GROUP-BASED TRUST MANAGEMENT SCHEME

The proposed trust model works with two topologies. One is the intragroup topology where distributed trust management is used. The other is intergroup topology where centralized trust management approach is employed. For the intragroup network, each sensor that is a member of the group calculates individual trust values for all group members. Based on the trust values, a node assigns one of the three possible states: 1) trusted, 2) untrusted, or 3) uncertain to other member nodes. This three-state solution is chosen for mathematical simplicity and is found to provide appropriate
granularity to cover the situation. After that, each node forwards the trust state of all the group member nodes to the CH. Then, centralized trust management takes over. Based on the trust states of all group members, a CH detects the malicious node(s) and forwards a report to the BS. On request, each CH also sends trust values of other CHs to the BS. Once this information reaches the BS, it assigns one of the three possible states to the whole group. On request, the BS will forward the current state of a specific group to the CHs.

Our group-based trust model works in three phases: 1) Trust calculation at the node level, 2) trust calculation at the cluster-head level, and 3) trust calculation at the BS level.

4.1 Trust Calculation at the Node Level

At the node level, a trust value is calculated using either time-based past interaction or peer recommendations. Whenever a node y wants to communicate with node x, it first checks whether y has any past experience of commu- nication with x during a specific time interval or not. If yes, then node x makes a decision based on past interaction experience, and if not, then node x moves for the peer recommendation method.

4.1.1 Time-Based Past Interaction Evaluation

Trust calculation at each node measures the confidence in node reliability. Here, the network traffic conditions such as congestion, delay, and so forth should not affect the trust attached to a node; this means that the trust calculation should not emphasize the timing information of each interaction too rigidly. Therefore, we introduce a sliding time window concept, which takes relative time into consideration and reduces the effects of network conditions on overall trust calculation. If real-time communication is a requirement, as is the case in most real-world applications, this timing window concept does not provide any hin- drance when it comes to real-time delivery of packets. The communication protocol in such applications is always accompanied with time stamps, and thus any node that delays the delivery of packets by taking advantage of the sliding timing window will be detected straightforwardly.

The timing window Δt is used to measure the number of successful and unsuccessful interactions. It consists of several time units. The interactions that occur in each time unit within the timing window are recorded. After a unit of time elapses, the window slides one time unit to the right, thereby dropping the interactions done during the first unit. Thus, as time progresses, the window forgets the experi- ences of one unit but adds the experiences of the newer time unit. The window length could be made shorter or longer based on network analysis scenarios. A sample scenario of the GTMS time window scheme is illustrated in Fig. 1. The time window Δt consists of five units. During the first unit of Δt1, the number of successful and unsuccessful interactions is 4 and 2, respectively, and during the whole

Δt1 interval, the number of successful and unsuccessful interactions is 29 and 15, respectively. After the passage of the first unit, the new time interval Δt2 drops the interaction values that took place during the very first unit of Δt1 S 4;U 2 and only consider the values of the last four units of Δt1 plus values of one recent unit added on the right ðS ¼ 6;U ¼ 2Þ.

With this time window information, the time-based past interaction trust value ðTx;yÞ of node y at node x that lies between 0 and 100 is defined as

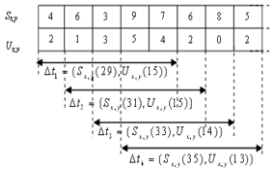

Fig. 1. Sliding time window scheme of GTMS.

T

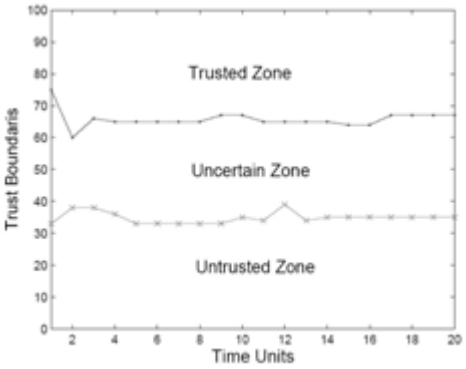

Fig. 3. Adaptive trust boundaries creation.

where ½•] is the nearest integer function, Sx;y is the total number of successful interactions of node x with y during time Δt, Ux;y is the total number of unsuccessful interactions

it would take considerably longer time for a node to increase

its trust value for another node. In order to balance this increase in the trust value with the increasing number of unsuccessful interactions, we multiply the expression with the factor Sx;y , which indicates the percentage

Sx;y þUx;y

of successful interactions among the total interactions. Thus,

4.1.2 Peer Recommendation Evaluation

Let a group be composed of n uniquely identified nodes. Furthermore, each node maintains a trust value for all other nodes. Whenever a node requires peer recommendation, it will send a request to all member nodes except for the untrusted ones. Let us assume that j nodes are trusted or uncertain in a group. Then, node x calculates the trust value of node y as follows:

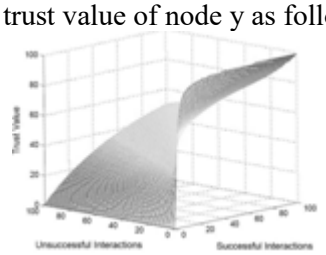

Fig. 2. Time-based past interaction evaluation.

where ½•] is the nearest integer function, Tx;i is the trust value of the recommender, and Ti;y is the trust value of node y sent by node i. Here, Tx;i is acting as a weighted value of the recommender that is multiplied with the

trust value Ti;y, sent by the recommender, such that the trust value of node y should not increase beyond the trust value between node x and the recommender node i.

4.2 Trust Calculation at the Cluster-Head Level

Here, we assume that the CH is the SN that has higher

computational power and memory as compared to other SNs.

4.2.1 Trust State Calculation of Own Group

In order to calculate the global trust value of nodes in a manner as individual nodes keep record of other nodes. Trust values of a group are calculated on the basis of either past interaction or information passed on by the BS. Here, we are not considering peer recommendations from other groups in order to save communication cost. Let us suppose CH i wants to calculate the trust value ðTi;j) of another cluster j. Then, it can be calculated by using either time- based past interaction exact trust values due to two reasons. First, the communication overhead would be less as only a simple state is to be forwarded to the CH. Second, the trust boundaries of an individual node vary from other nodes. A particular trust value might be in a trusted zone for one node, whereas it may only correspond to the uncertain zone for another node. Hence, the calculation of the global trust state of nodes in a group would be more feasible and efficient if we only calculate it using the trust states.

Let us suppose there are n þ 1 nodes in the group including the CH. The CH will periodically broadcast the

4.3 Trust Calculation at Base Station Level

The BS also maintains the record of past interactions with CHs in the same manner as individual nodes do, as shown below:

nodes to the CH. The variable, s, can take three possible states:

trusted, uncertain, and untrusted. The CHwill maintain these trust states in a matrix form, as shown below:

where ½•] is the nearest integer function, SBS;ch is the total number of successful interactions of BS with CH during time Δt, and UBS;ch is the total number of unsuccessful interactions of BS with CH during time Δt.

Let us suppose there are jGj groups in the network. BS periodically multicasts request packets to the CHs. On request, the CHs forward their trust vectors, related to the where TMch represents the trust state matrix of cluster head ch, and sch;1 represents the state of node 1 at cluster head ch. The CH assigns a global trust state to a node based on the relativedifferenceintruststatesforthatnode. Weemulatethis relative difference through a standard normal distribution.

recommendations of other groups based upon past interactions, to BS as given by.

On reception of trust vectors from all the CHs, the BS will calculate the trust value of each group in a manner shown below:

Therefore, the CH will define a random variable X such that

5 SIMULATION-BASED ANALYSIS AND EVALUATION

5.1 Simulation Environment

We have performed simulation using Sensor Network Simulator and Emulator (SENSE) [40]. We have deployed three different sized sensor networks consisting of 144, 225, and 324 SNs. More details about these networks are available in Table 5. Nodes are static and are organized in a grid fashion. The first, second, and third networks are comprised of 16, 25, and 36 clusters, respectively. These

TABLE 2

Trust Database at SN

Node ID	Past interactions based on time window						Peer recomm.	Trust value
	$S_{x,y}$			$U_{x,y}$				
	t_1	$\cdots$	t_n	t_1	$\cdots$	t_n		
2 bytes	2 bytes	$\cdots$	2 bytes	2 bytes	$\cdots$	2 bytes	1 byte	1 byte

TABLE 4

Memory Requirement of Trust Management Schemes

	Sensor node	cluster head
GTMS	$(n-1)(4+4\Delta t)$	$(\lvert G\rvert+\sigma-2)(4+4\Delta t)$
RFSN	$33(n-1)$	$33(G+\sigma-2)$
PLUS	$32.375(n-1)+28$	$32.375(G+\sigma-2)+28$
ATRM	$30n+8(k-1)$	$30(G+\sigma)+2(4k-19)$

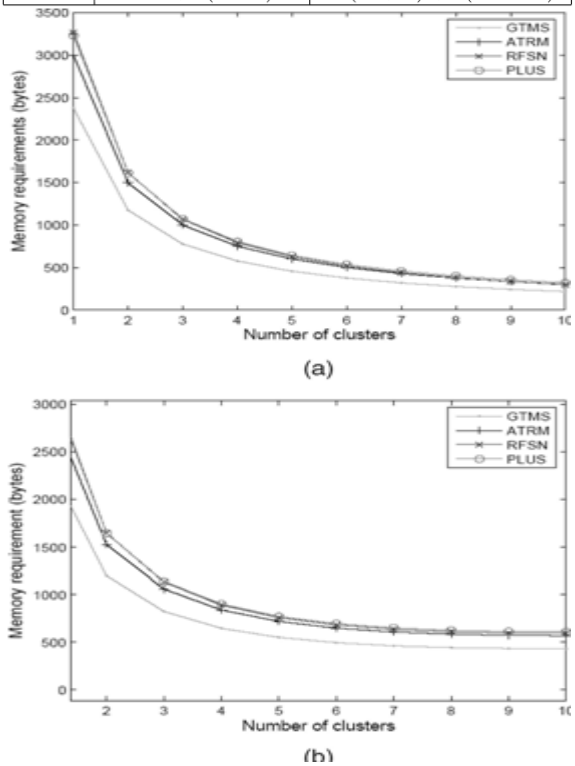

Fig. 5. Memory requirement: N ¼ 100 and Δt ¼ 5 units. (a) At SN. (b) At cluster head.

1. SourceID: contains the identity of the source node.
2. DestID: contains the identity of the destination node.
3. Protocol ID: represents the identity of the trust management protocol, e.g., GTMS, RFSN, and so forth.
4. Type: is used to identify the type of the packet such as request packet, response packet, acknowledgment packet, and so forth.
5. Payload: field is of variable size containing the data specific to the type and protocol, such as trust value, identity of evaluating node, and so forth.
6. SendT: contains the sending time of the packet.

TABLE 5

Sensor Network's Specifications

Network size	No. of clusters	Terrain
144 nodes	16	$600m \times 600m$
225 nodes	25	$800m \times 800m$
324 nodes	36	$1000m \times 1000m$

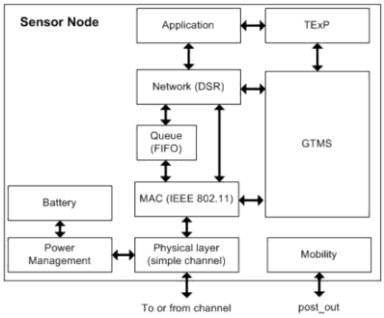

Fig. 6. SN architecture.

The objective of the TExP protocol is to exchange the trust values between communicating nodes in an efficient manner. SN architecture based on SENSE [40] is shown in Fig. 6, which shows the interactions between GTMS, TExP, and other components. The rest of the specifications of an SN is defined in Table 6.

6.2 Comparison

For the purpose of comparison, we have implemented a peer recommendation scenario. During simulation, in each cluster, random number of source nodes are selected, which perform peer recommendation with the other nodes. Also, each cluster head will perform peer recommendation with neighboring cluster heads only. In the simulation, we have only compared our proposed GTMS with the RFSN scheme because both are independent of any specific routing scheme and platform. We did not implement the ATRM scheme because it requires some specific agent-based platform. Also, we did not implement PLUS because it works on the top of its own defined routing protocol.

Communication overhead for the three different networks is shown in Fig. 7, which confirms our conclusions from the theoretical analysis. Fig. 7a shows that the GTMS introduces less communication overhead as compared to the RFSN scheme, and this pattern (overhead difference) approximately remains the same for all 100 simulation runs. Therefore, we conclude that the 100 simulation runs can give us reliable results. Fig. 7b shows that, as the network size increases, the communication overhead difference between the GTMS and RFSN scheme also increases. It shows that the GTMS would introduce 14.6 percent,15.7 percent, and 17.1 percent less communication overhead

TABLE 6

SN's Specifications

Initial battery of each sensor node	$1 \times 10^6 J$
Power consumption for transmission	$1.6W$
Power consumption for reception	$1.2W$
Power consumption in idle state	$1.15W$
Transmission power of the antenna	0.0280
Transmission and Reception gain	1.0
Carrier sense threshold	$3.652e^{-10}W$
Receive power threshold	$1.559e^{-11}W$

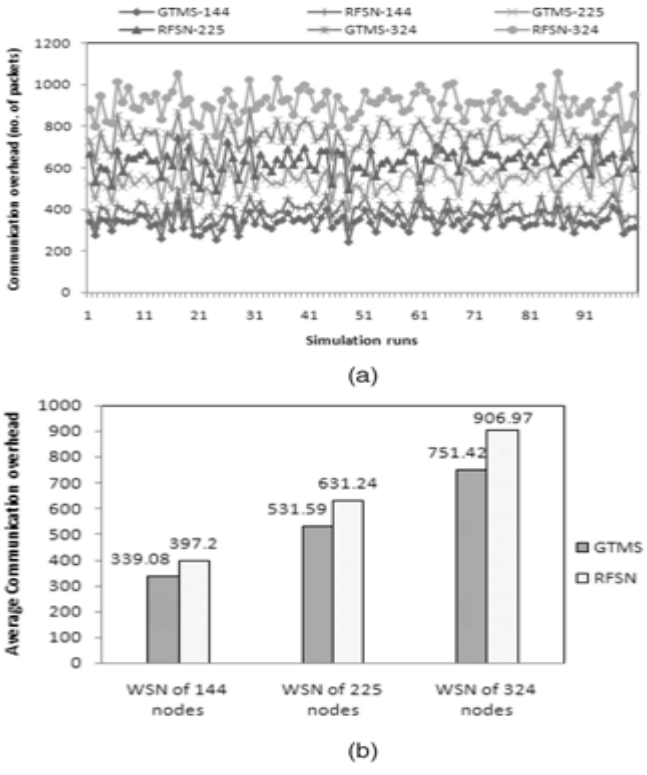

Fig. 7. Average communication overhead analysis (100 simulations).

(a) Communication overhead. (b) Average communication overhead.

as compared to the RFSN scheme for the network of 144, 225, and 324 nodes, respectively.

Communication overhead also affects the energy consumption of the SNs. That effect is visible in Fig. 8, which shows that GTMS also consume less energy as compared to the RFSN scheme.

6 CONCLUSION AND FUTURE DIRECTIONS

With the emergence of widespread use of WSNs, the need of a proper trust management scheme is strongly felt. In this work, we have proposed a robust lightweight GTMS for clustered WSNs. GTMS uses a hybrid trust management approach, which reduces the cost of trust evaluation. We showed that our scheme is memory efficient and consumes less communication overhead. We also proved that the GTMS is intrusion tolerant and provides protection against malicious, selfish, and faulty nodes.

In many application scenarios [41], [42], SN identities should remain hidden for achieving identity anonymity. So, the challenging problem is how to establish and maintain trust between communicating nodes in an identity anon- ymous environment. This motivates future work.

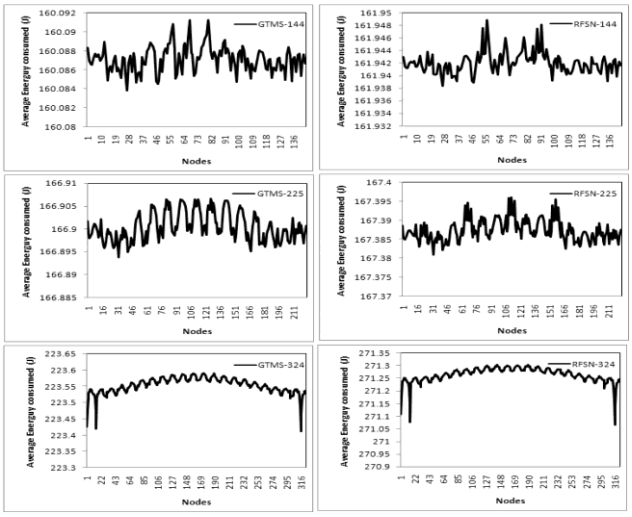

Fig. 8. Average energy consumption at each node (100 simulations).

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DESIGN & IMPLEMENTATION OF WIRELESS SENSOR NETWORKS

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Abstract— Sensing any change in the physical environment and delivering this real time information about the system to the remote station for analysis has created many applications. With the research and development in the science and technology new wired and wireless technologies for sensing have been developed with time. This paper presents an information these technologies used for wired and wireless sensor networks. For wireless sensor network some features of zigbee, enOcean, wavenis, Z-wave, wifi and Bluetooth are discussed in this paper. Brief discussion of different applications of the sensor networks is also presented.
Keywords—applications; technologies; wired sensor network; wireless sensor network

1. INTRODUCTION

Sensor network is a group of nodes which gathers data according to their specialty. The node contains the power source, microprocessor, external memory, sensors, analog to digital converter and transceivers. Microprocessors in the nodes perform the necessary operation on data prior to send it to the remote station. Microprocessor has limited internal memory. So the external memory is also provided in the node to store the sensing data. Sensors are the physical devices which collects the environmental data as the analog signal. Then this data is converted into the digital with the help of analog to digital converter present in the node. Transceiver is the device in the node which receives the control signal from the sender and sends the operator data from the sensors to the remote station.

Power source provide the energy (electricity) to the node for its operation. This power source as a battery for the wireless sensor nodes or through cable connection for the wired sensor or the power can be generated with the some energy harvesting modes like solar cell etc. Sensor networks further can be divided into two types:

1. Wired sensor network

In the wired sensor networks power source is wired. The power is continuously supplied to the node. Moreover the data from /to transceiver is send/received using wired

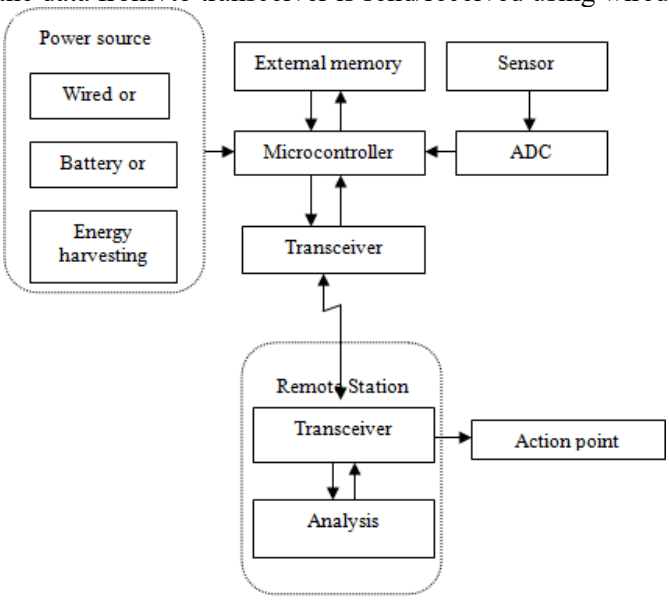

Fig. 1 Block Diagram of wireless Sensor Node

communication channel. These sensor networks are highly reliable and their applications are limited. Moreover they have mesh network of the wires connecting to the network which makes them complex to handle and increase their cost.

2. Wireless sensor networks

In wireless sensor network the nodes are not connected with any wire. Transceivers wirelessly send /receive the data and control signals to the control center or from the control center. In wireless sensor networks communication channel is the frequency spectrum. Moreover the power source in these nodes is the battery. As these nodes are implemented in very far areas, batteries are changed after a long time. Therefore energy consumption issue is the main research topic for wireless sensor networks. Now the data gathered at the field location is transferred to the remote station through the transceiver by the wireless channel. There data is

processed for the analysis and required actions are being taken. As shown in Fig.1 energy can be provided by three ways (battery, wire or energy harvesting module) to the sensor node. Data gathered by the sender node is sent to the remote station through wireless channel. After processing data at the remote station action is taken according to the requirement.

In the wireless sensor networks, the parameters which evaluate the performance of the network are packet delay, reliability, fault tolerance, energy consumption etc. Preference of these parameters changes from application to application.

2. TECHNOLOGIES

There are other different technologies which are used in the wireless sensor networks .these are –zigbee ,z-wave ,wavenis ,wifi,EnOcean,Bluetooth,Insteon,x10 etc.

A. Zigbee

This technology is built on the IEEE 802.15.4 media standard and this works from layer 3 to the application layer of the ISO-OSI model [1]. Its working frequencies are 868 MHz, 915 MHz, and 2.4 GHz and low bit rate transmission 20kbps, 40kbps and 250kbps respectively. Moreover it is low cost wireless network technology. It has short delay and provides faster response. It need 15ms to wake up from sleeping mode and only 30ms to access the network. For insurance of reliable data transfer it uses dynamic routing protocol. Generally mesh network topology is used for the interconnection of the nodes, as in this there are at least two pathways to connect each node. In mesh each node is self routed and able to connect to other nodes if needed. A large number of nodes can use zigbee at the same time. 65000 nodes can be supported at most in a zigbee network. It has low power consumption. Two AA batteries can be used for 6 month to 2 years duration in low power standby mode [2]. Its low power consumption is due to the PSK modulation techniques, increased sleeping time of the node and use of EEMAC algorithm on the MAC layer [3]. Zigbee operates up to a range 10 to 100 meter. There are three ways in which security is provided by the zigbee technology. It uses AES encryption for the high-level secure transfer of the data. It also has option of no security setting and using access control list. So these features of the zigbee technology provide a great scope for its use.

B. EnOcean

It is a wireless network technology which has been very successful in Europe. Its main focus is on the energy efficiency .To achieve this it does not use the normal communication reliability procedures like message acknowledgement and CSMA. EnOcean resolve this issue using very short messages which reduce the message collision probability and hence save energy avoiding the repetition of message several times. It is not a feature rich, able to handle adhoc networks and not very complex as it is equipped with the energy harvesting modules .Energy can be harvested from environmental resources like solar energy, temperature difference or vibration/motion. EnOcean uses direct media access control (MAC) scheme [4].

C. Wavenis

It was made for ultra low power energy consumption and long range transmission of small amount of data. It has automated 2-way communication. It supports Asynchronous or synchronous operation depending on network size and application [5]. It has feature of easy network device setup. Every device using wavenis technology support repeater function upto 4 hops. Wavenis operates in license free ISM bands .It has following regulatory standards.

1. 868 MHz (EU EN 300-220) with strict duty cycle regulation.
2. 915 MHz (US FCC 15 247, 15-249) with mandatory signal spreading.
3. 433 MHz with no duty cycle restriction.

Wavenis applications communicate at 19.2 Kbps [1].

D. X10

This protocol is used in smart homes and it is used for wired sensor networks. It uses electrical power lines to transmit message signals, incurs low cost and easy to install .It also has less data transfer rate-20 bps. Moreover X10 is inclined towards noise [6].

E. Insteon

It is the modification of the legacy X10 and is backward compatible to X10. Insteon uses both radio frequency signals and the home's existing electrical wiring as the communication channel. It provides error detection and automatic error correction of the data packet. In the mesh network of the Insteon every device acts as a repeater-receives and sends the every message to all other devices on the network and they do not contain any routing tables. This technology operates with frequency 131 kHz on power lines and for wireless transmission radio frequencies used in US and Europe is 915MHz and 868MHz respectively but Radiofrequency used in Australia and New Zealand is 921MHz. It can support 16,777,216 maximum devices per network. Its new feature is wireless communication [7].

F. Z-wave

It is a wireless communication standard designed for remotely controlled applications in residential and light

commercial environments. Its speed is 40 kbps (915MHz) and reach is up to 30 meter in air and reduced indoor. It is widely adopted and uses 128-bit AES encryption for the security purpose and avoids interference with Wifi, Bluetooth and other systems that operate on crowded 2.4 GHz. It was developed by Denis Startup called Zen-Sys that was acquired by sigma designs in 2008 [1].

G. wifi

It is a popular wireless technology based on IEEE 802.11 standards and used in home networks. Speed can reach from 11Mbps-300Mbps.Its adoption rate is extremely high

.Wifi can be less secure than the wired connections. For security purpose it uses Wifi protected access 2(WPA2) 802.11i [1]. Wifi has high power consumption as the data rates and range is high. Wireless access point using 802.11g and 802.11b has a range of 35 m in doors and 100m outdoors.

H. Bluetooth

It is short range, wireless technology and is basically wire substitute. This technology is based on IEEE 802.15.1. It is very efficient and processing bandwidth is 1000-3000Kbps. It operates in the range 2400-2483.5 MHz and makes network of maximum 7 nodes and network called piconet [2].

Brief comparison of typical wireless network technologies is given in table I.

TABLE I. COMPARISON OF TYPICAL WIRELESS NETWORK TECHNOLOGIES

	Technologies			
	Zigbee	***z-wave***	***bluetooth***	***wavenis***
Data rate	20,40,250kbps	40kbps	1000-3000kbps	19.2kbps
Range (in meter)	10-100m	30m,in open air	50m	Significant range
Application Area	Monitoring and control	Remote control application	Wire substitute	Remote control and data monitoring
Standard	IEEE 802.15.4	Proprietary wireless communication standard	IEEE 802.15.1	Certified ETS300-220, FCC15-247, 15-249
Security	128 bit AES encryption	128 bit AES encryption	SAFER+ Block cipher	3DES, AES 128, RSA

from the experts, data stored in the database for the future use has been included.

A wireless sensor network has been proposed with the sensor which senses the pH value of the water of the river [10]. In this monitoring areas are divided into sub areas like area near water pump house(A), near factory industry(B), near agricultural land(C) and near residential area(D). In each area with the cluster of sensor nodes a head node is located. Sensor nodes are deployed at the different depths of the river to measure the water quality at other levels also. A Head node from the respective clusters takes the data from other nodes and sends it to the remote station for the processing. The system in this uses zigbee communication to meet the low power consumption requirements of the development scenario. And in [11] the parameter under investigation include temperature, phosphate, dissolved oxygen, conductivity, pH, turbidity, and water level in the smartCoast R&D project, co-founded by the Irish Marine Institute and EDA.

3. APPLICATIONS

In an application of WSN the avalanche conditions can be identified in the respective areas before the actual loss by this natural calamity [12]. In this system the sensor is made up of the two or more elementary radiators. The radiators belonging to the sensor are immersed in the snow one after another. As the snow melts the water level in the snow increases which increase the conductivity of the medium. And after performing the required calculations the threshold value for the danger alerts can be calculated.

WSN are also used to know the oilfields on the sea floor or the seismic movement monitoring [13]. Effective energy efficient node replacement and routing algorithms has been discussed. The nodes are autonomous and use wireless acoustic transmission for data transmission.

A system to monitor the temperature in cold chain logistics in transportation has been made [14]. It prevents the perishing of the food. The system used integration of the wireless microcontroller JENNIC 5418 based on IEEE

According to the specification of the sensors, area of applications of sensor networks is very versatile. Most of the population, at the present time is in the developing countries and main income source in these countries is agriculture. With the development of the technology in the past decades green house management agriculture introduced to increase the farm production efficiency and profitability by reducing unintended effects on green house environment. The necessary parameters like

temperature, humidity and irrigation in the green house can be known by the wireless technology zigbee at low cost. zigbee module is used to continuously monitor the parameter data of the green house and send to the remote station where it is get operated on the LabView GUI Software and control signal send back to the green house to maintain the parameter value level [8].

Similar and extended functionality of the operations has been described in [9]. In this, the data gathered is put on the web portal and along with it the user feedbacks of the products, future market trends and the knowledge seminar

802.15.4 standard with a thermocouple sensing converter MAX31855. They used the wireless access points integrated with the GPS and the 3G communication system.

In the medical fields, WSN provides the diagnostic minority systems those do not involve puncturing the skin or entering a body cavity. In the current research it is desired to integrate more biosensors, electronics and wireless technologies into low power sensing devices that can be worn or directly planted into the patients. Other wireless applications in the hospitals are to localize the assets and streamlining hospital staff by integrating personal digital assistant (PDA) or smart phone of doctors to the larger hospital network. Smart surgical tools provide wireless sensing and tracking for computer assisted surgery and seamless use inter operatively [15].

4. CONCLUSION

There are number of technologies of wired and wireless sensor networks. These technologies are using the different protocols and provide the different values for the performance parameters. Zigbee technology provides considerable data rate along with the low power consumption. EnOcean uses special messages instead of CSMA protocol to reduce the energy consumption. X10 and Insteon technologies can work on the electrical power lines which make them suitable for home automation. Wifi is high power consuming and high data rate delivering technology. Its high power consumption makes it inapplicable for wireless sensor node. Bluetooth is also a high power consumption technology which provides high data rate for shorter ranges. The main constraint of wireless sensor networks is to operate on the lowest possible level of the energy. This is because that the wireless nodes are deployed in the field which are rarely visited or attended and more over their battery replacement is costly.

Wireless sensor networks are used in the versatile applications. These are being used in agriculture, home automations, environmental condition monitoring, defense areas, and medical field.

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SEPTIC: DETECTING INJECTION ATTACKS AND VULNERABILITIES INSIDE THE DBMS

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ABSTRACT :- Databases continue to be the most commonly used backend storage in enterprises, but they are often integrated with vulnerable applications, such as web frontends, which allow injection attacks to be performed. The effectiveness of such attacks stems from a semantic mismatch between how SQL queries are believed to be executed and the actual way in which databases process them. This leads to subtle vulnerabilities in the way input validation is done in applications. In this paper, we propose SEPTIC, a mechanism for DBMS attack prevention, which can also assist on the identification of the vulnerabilities in the applications. The mechanism was implemented in MySQL and evaluated experimentally with various applications and alternative protection approaches. Our results show no false negatives and no false positives with SEPTIC, on the contrary to other solutions. They also show that SEPTIC introduces a low performance overhead ,in the order of2.2%

1. INTRODUCTION

Web applications have been around for more than two decades and are now an important component of the economy, as they often serve as an interface to various business related activities. Databases continue to be the most commonly used backend storage in enterprises, and they are often integrated with web applications. However, web applications can have vulnerabilities, allowing the data stored in the databases to be compromised.

SQL injection attacks (SQLI), for example, continue to rise in number and severity. Commonly used defenses are validation functions, web application firewalls (WAFs), and prepared statements. The first two inspect web application inputs and sanitize those that are considered dangerous, whereas the third bounds inputs to placeholders in the SQL queries.1 Other anti-SQLI mechanisms have been developed but less adopted. Some of these monitor and block SQL queries that deviate from specific models, but the inspection is made without full knowledge about how they are processed by the DBMS. In all these cases, developers and system administrators make assumptions about how the server-side scripting language and the DBMS work and interact, which sometimes are simplistic, whereas in others are blatantlywrong.

For example, programmers usually assume that the PHP function mysql_real_escape_string always effectively sanitizes inputs and prevents SQLI attacks, which is not true. Also, they often assume that values retrieved from a database do not need to be validated before being inserted in a query, leading to second-order injection vulnerabilities. This is visible when, for instance, the code admin' - - is sanitized by escaping the prime character before sending it to the database, but the DBMS unsanitizes it before actually storing it. Later, the code is retrieved from the database and used unsanitized in some query, carrying out the attack.

2. LITERATURE REVIEW

SQL injection attacks are one of the topmost threats for applications written for the Web. These attacks are launched through specially crafted user input on web applications that use low level string operations to construct SQL queries. In this work, we exhibit a novel and powerful scheme for automatically transforming web applications to render them safe against all SQL injection attacks. A characteristic diagnostic feature of SQL injection attacks is that they change the intended structure of queries issued. Our technique for detecting SQL injection is to dynamically mine the programmer-intended query structure on any input, and to detect attacks by comparing them against the intended query structure. We propose a simple and novel mechanism, called Candid, for mining programmer intended queries by dynamically evaluating runs over benign candidate inputs. This mechanism is theoretically well founded and is based on inferring intended queries by considering the

symbolic query computed on a program run. Our approach has been implemented in a tool called Candid that retrofits Web applications written in Java to defend them against SQL injection attacks. We report extensive experimental results that show that our approach performs remarkably well in practice.

We present a practical protection mechanism against SQL injection attacks. Such attacks target databases that are accessible through a web front-end, and take advantage of flaws in the input validation logic of Web components such as CGI scripts. We apply the concept of instruction-set randomization to SQL, creating instances of the language that are unpredictable to the attacker. Queries injected by the attacker will be caught and terminated by the database parser. We show how to use this technique with the MySQL database using an intermediary proxy that translates the random SQL to its standard language. Our mechanism imposes negligibleperformanceoverheadtoqueryprocessingandcan beeasilyretrofittedtoexistingsystems.

Security testing is a pivotal activity in engineering secure software. It consists of two phases: generating attack inputs to test the system, and assessing whether test executions expose any vulnerabilities. The latter phase is known as the security oracle problem. In this work, we present SOFIA, a Security Oracle for SQL-Injection Vulnerabilities. SOFIA is programming-language and source-code independent, and can be used with various attack generation tools. Moreover, because it does not rely on known attacks for learning, SOFIA is meant to also detect types of SQLi attacks that might be unknown at learning time. The oracle challenge is recast as a one-class classification problem where we learn to characterise legitimate SQL statements to accurately distinguish them from SQLi attack statements. We have carried out an experimental validation on six applications, among which two are large and widely-used. SOFIA was used to detect real SQLi vulnerabilities with inputs generated by three attack generation tools. The obtained results show that SOFIA is computationally fast and achieves a recall rate of 100% (i.e., missing no attacks) with a low false Most web applications have critical bugs (faults) affecting their security, which makes them vulnerable to attacks by hackers and organized crime. To prevent these security problems from occurring it is of utmost importance to understand the typical software faults. This paper contributes to this body of knowledge by presenting a field study on two of the most widely spread and critical web application vulnerabilities: SQL Injection and XSS. It analyzes the source code of security patches of widely used web applications written in weak and strong typed languages. Results show that only a small subset of software fault types, affecting a restricted collection of statements, is related to security. To understand how these vulnerabilities are really exploited by hackers, this paper also presents an analysis of the source code of the scripts used to attack them. The outcomes of this study can be used to train software developers and code inspectors in the detection of such faults and are also the foundation for the research of realistic vulnerability and attack injectors that can be used to assess security mechanisms, such as intrusion detection systems, vulnerability scanners, and static codeanalyzers.

Intrusion detection systems (IDS) are an important component to effectively protect computer systems. Misuse detection is the most popular approach to detect intrusions, using a library of signatures to find attacks. The accuracy of the signatures is paramount for an effective IDS, still today's practitioners rely on manual techniques to improve and update those signatures. We present a system, called pSigene, for the automatic generation of intrusion signatures by mining the vast amount of public data available on attacks. It follows a four-step process to generate the signatures, by first crawling attack samples from multiple public cyber security web portals. Then, a feature set is created from existing detection signatures to model the samples, which are then grouped using a biclustering algorithm which also gives the distinctive features of each cluster. Finally the system automatically creates a set of signatures using regular expressions, one for each cluster. We tested our architecture for SQL injection attacks and found our signatures to have a True and False Positive Rates of 90.52% and 0.03%, respectively and compared our findings to other SQL injection signature sets from popular IDS and web application firewalls. Results show our system to be very competitive to existing signature sets

SQL injection attacks (SQLIAs) aim at exploiting vulnerabilities in web applications in order to execute malicious SQL commands. It is established that prepared statements are resilient to SQLIAs, and thus, developers are advised to use them when constructing SQL queries as opposed to applying string concatenation operations. Unfortunately, this recommended programming practice is not as pervasive as it should be. This paper addresses this shortcoming by presenting SQL injection Prevention by Input Labeling (SQLPIL), an effective, light, and fully automated tool that leverages prepared statements to prevent SQLIAs at runtime. Given a Java program in which SQL queries are built as strings, SQLPIL

dynamically transforms the strings into secure prepared statements right before their execution, thus guaranteeing that malicious input will always be treated as data and never as SQL commands. We empirically evaluated our Java implementation of SQLPIL using a benchmark that includes five JSP commercial applications, a number of legitimate queries, and a number of attacks of representative types. The results were promising as all attacks were prevented, and all legitimate runs executed successfully; in other words, the technique exhibited no false alarms when applied on typical applications. Also, the runtime cost was acceptable, assuming typical settings. Copyright © 2015 John Wiley & Sons,Ltd.

PROPOSED WORK

In this paper, we propose SEPTIC, a mechanism for DBMS attack prevention, which can also assist on the identification of the vulnerabilities in theapplications.

The mechanism was implemented in MySQL and evaluated experimentally with various applications and alternative protectionapproaches.

3. RESULT ANALYSIS AND DISCUSSIONS

This project is implements like web application using COREJAVA and the Server process is maintained using the SOCKET & SERVERSOCKET and the Design part is played by Cascading Style Sheet.

Figure 1. UserLogin.jsp

Figure 2. HomePage.jsp

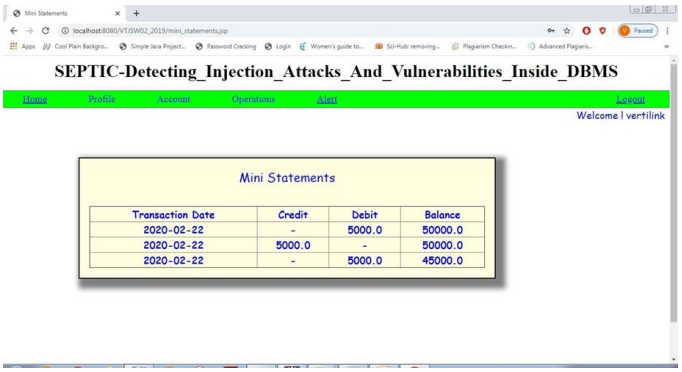

Figure 3. Dashboard.jsp

4. CONCLUSION

This paper explored a new form of protection from attacks against web and business application databases. It presented the idea of catching attacks inside the DBMS, letting it protected from SQLI and stored injection attacks. Moreover, by putting protection inside the DBMS, we showed that it is possible to detect and block sophisticated attacks, including those related with the semantic mismatch problem. As a second idea, it presented a form of identifying vulnerabilities in application code, when attacks were detected. This paper also presented SEPTIC, a mechanism implemented inside MySQL. In order to do detection, SEPTIC resorts to a learning phase, and quarantine and aging processes that deal with models of queries, creating and managing them. The mechanism was experimented both with synthetic code with vulnerabilities inserted on purpose and with open-source PHP web applications, and other type of applications. This evaluation suggested that the mechanism could detect and block the attacks it was programmed to handle, performing better that all other tools in the literature and the WAF most used in practice, and can identify the vulnerabilities in code of applications, when the attacks attempted exploit them. The performance overhead evaluation of SEPTIC inside MySQLshowsanimpactofaround2.2%,suggestingthatoura pproachcanbeusedinrealsystems.

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DYNAMIC CLOUD RESOURCE ALLOCATION CONSIDERING DEMAND UNCERTAINITY

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ABSTRACT :- Cloud computing provisions scalable resources for high performance industrial applications. Cloud providers usually offer two types of usage plans: reserved and on- demand. Reserved plans offer cheaper resources for long-term contracts while on-demand plans are available for short or long periods but are more expensive. To satisfy incoming user demands with reasonable costs, cloud resources should be allocated efficiently. Most existing works focus on either cheaper solution with reserved resources that may lead to under-provisioning or over-provisioning, or costly solutions with on-demand resources. Since inefficiency of allocating cloud resources can cause huge provisioning costs and fluctuation in cloud demand, resource allocation becomes a highly challenging problem. In this paper, we propose a hybrid method to allocate cloud resources according to the dynamic user demands. This method is developed as a two-phase algorithm that consists of reservation and dynamic provision phases. In this way, we minimize the total deployment cost by formulating each phase as an optimization problem while satisfying quality of service. Due to the uncertain nature of cloud demands, we develop a stochastic optimization approach by modeling user demands as random variables. Our algorithm is evaluated using different experiments and the results show its efficiency in dynamically allocating cloud resources.

1. INTRODUCTION

Cloud computing is a popular networking paradigm that provides resources via Internet Cloud computing helps web service providers reduce hardware infrastructure expenses for deploying their applications. In addition, easy resource management and fast response time are the other interesting characteristics that bring the attentions to the cloud computing. In this paper, the focus is on cloud Infrastructure-as-a-Service (IaaS), where infrastructure resources such as network, computing, database, etc. are offered by cloud providers.

Cloud providers usually offer two types of IaaS resource provisioning plans, reserved and on-demand plans, to web service providers that have different charging schemes based on the resource usage. The reserved plans are often offered for relatively long-term contracts. Using reserved plans, web service providers can get discount rateson reserved resources and pay once for the contract time period (e.g. one-year contract or three-year contract for Amazon EC2). Through on-demand plans, cloud providers offer more flexible resource pricing strategies. On-demand plans charge cloud web service providers on a pay-as-you go basis and enable them to start or terminate instances at any moment according to their needs without paying any penalty. However, comparing the costsofresourcesperunitoftime,on-demandresourcesareoftenmoreexpensivethanthe reservedones.

With the reserved plans, web service providers reserve instances in advance for long-term contracts. Due to ignorance of demand uncertainty in the reserved plans, resourceprovisioningonlywiththereservedinstancesisacha llengingtask.Thepurchased resources may not be enough to handle the demands all the time that leads to under provisioning. This may result in failure in meeting web service providers' Quality of Service (QoS) criteria which is a crucial concern for both cloud providers and webservice providers in presence of the uncertainty in the demands. On the other hand, over-provisioningmayhappeniftheallocatedresourcesareexcess ivetohadleactualarrived

2. LITERATURE REVIEW

A large number of geo-distributed data centers begin to surge in the era of data deluge and information explosion. To meet the growing demand in massive data processing, the infrastructure of future data centers must be energy-efficient and sustainable. Facing this challenge, a systematic framework is put forth in this paper to integrate renewable energy sources (RES), distributed storage units, cooling facilities, as well as dynamic pricing into the workload and energy

management tasks of a data center network. To cope with RES uncertainty, the resource allocation task is formulated as a robust optimization problem minimizing the worst-case net cost. Compared with existing stochastic optimization methods, the proposed approach entails a deterministic uncertainty set where generated RES reside, thus can be readily obtained in practice. It is further shown that the problem can be cast as a convex program, and then solved in a distributed fashion using the dual decomposition method. By exploiting the spatio-temporal diversity of local temperature, workload demand, energy prices, and renewable availability, the proposed approach outperforms existing alternatives, as corroborated by extensive numerical tests performed using real data.

This paper focuses on the design of cloud service provisioning schemes over converged optical network and computing infrastructures. A major issue linked with the operation of these infrastructures is their sustainability in terms of energy consumption and CO 2 emissions. Given that most of the power consumption of the converged infrastructures is attributed to the operation of computing resources, the concept of powering-up computing resources with renewable energy sources is becoming a promising solution. However, the time variability and uncertainty of cloud services as well as the stochastic nature of renewable energy sources makes the evaluation and exploitation of such systems challenging. To address this challenge, we propose a novel service provisioning scheme based on stochastic linear programming (SLP). To cope with the increasing computational complexity inherent in SLP formulations, dimensionality reduction techniques, such as the sample average approximation and Lagrangian relaxation, are adopted. Based on measurements from the National Solar Radiation Data Base, traffic statistics from the Internet2 measurement archive, and experimentations with real network configurations, it is proven that the proposed scheme is stable and achieves fast convergence to the optimal solution, while at the same time reduces the overall CO 2 emissions by up to 60% for different levels of demand requests. The performance of the proposed provisioning scheme is compared with traditional approaches.

In this paper, we attempt to investigate about how to deal with events stated by uncertainty demand in cloud computing environment between Software as a Service provider, Software as a User and cloud resources provider. The variation considers the supply and demand of resources. The events on uncertainty demand ensure provisioning resources and prevent fluctuation demand. We propose to create resource negotiation and use Fuzzy Optimization for demand fluctuation. This result is relation to the event on uncertainty demand in cloud. The issue is to model the uncertainties on demand to warranty quality of service.

With growing demands for cloud computing services, the idea of managing limited cloud resources for making a profit has arisen as an important problem. Auction theory is recently considered as a viable way to solve the problem of cloud resource allocation. In this paper, we consider a model for Cloud of Clouds Networks (CCNs) with different types of servers along with customers with heterogeneous demands, in which customers and cloud servers may join and leave the CCN at will. We propose an options-based sequential auction that not only provides a good match with the dynamic structure of the problem, but also solves the entrance time problem and possesses the truthfulness property. We study both first-price and second-price options-based sequential auctions, and model the price matching processes in those auctions as Markov chains. We provide mathematically tractable methods to find the expected value of the CCN manager's revenue, and further show how the proxy agents' patience time affects the CCN manager's revenue.

Cloud providers can offer cloud consumers two plans to provision resources, namely reservation and on-demand plans. With the reservation plan, the consumer can reduce the total resource provisioning cost. However, this resource provisioning is challenging due to the uncertainty. For example, consumers' demand and providers' resource prices can be fluctuated. Moreover, inefficiency of resource provisioning leads to either over provisioning or under provisioning problem. In this paper, we propose a robust cloud resource provisioning (RCRP) algorithm to minimize the total resource provisioning cost (i.e., over provisioning and under provisioning costs). Various types of uncertainty are considered in the algorithm. To obtain the optimal solution, a robust optimization model is formulated and solved. Numerical studies are extensively performed in which the results show that the solution obtained from the RCRP algorithm achieves both solution-and model-robustness. That is, the total resource provisioning cost is close to the optimality (i.e., solution-robustness), and the over provisioning and under provisioning costs are significantly reduced (i.e., model-robustness).

The solution of multidomain/multiphysics problems is a computationally and memory demanding process, especially for large-scale differential equations. In this paper, we propose a cloud application that provides users

a solution environment for multiphysics/multidomain problems utilizing cloud technologies that manage pre-existing hardware, network, operating system and applications. Particularly, according to the problem and its computational demands, the user can have the results from any place and any device without any other concern. The user sets the problem's parameters, chooses the solution method that fits better to the specific problem and finally gets the problem solution. The application dynamically allocates the minimum possible resources automatically in the background without the user's interference.

3. PROPOSED WORK

In this paper, we propose a hybrid method to allocate cloud resources according to the dynamic userdemands. Thismethodisdevelopedasatwo-phasealgorithmthatconsistsofreservationand dynamic provisionphases.

In this way, we minimize the total deployment cost by formulating each phase as an optimization problem while satisfying quality ofservice

4. RESULT ANALYSIS AND DISCUSSIONS

This project is implements like web application using COREJAVA and the Server process is maintained using the SOCKET & SERVERSOCKET and the Design part is played by Cascading Style Sheet.

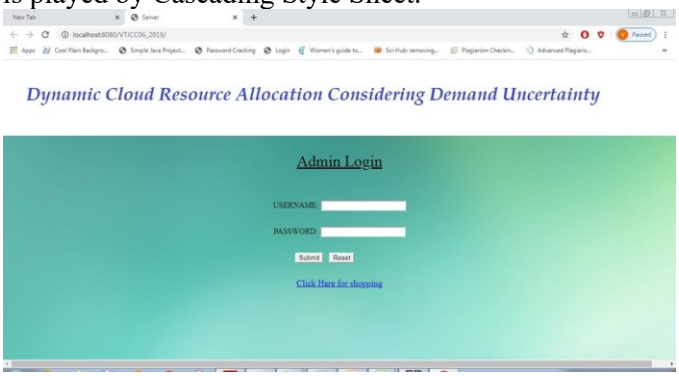

Figure 1. UserLogin.jsp

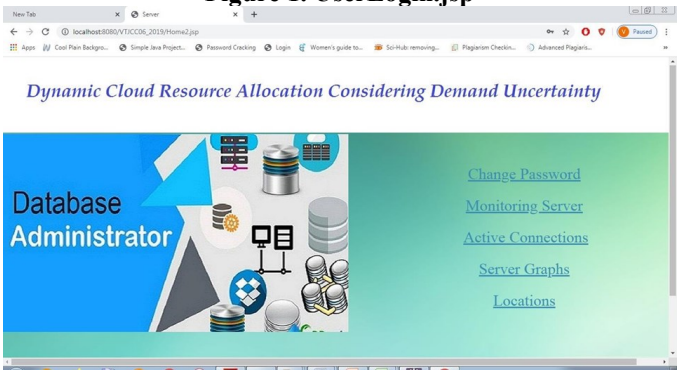

Figure 2. HomePage.jsp

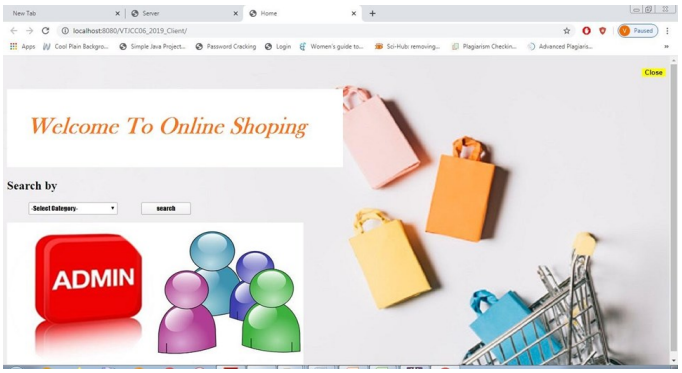

Figure 3. Dashboard.jsp

5. CONCLUSION

Acost-efficientdynamicprovisioningalgorithmforcloudbasedwebapplicationsincloud environment is proposed that focuses on optimizing the total provisioning costs while consideringtheuncertaintiesintheuserdemands.TheproposedDCRAismodeledintwo-phases:reservationanddynamicprovisionphases.Toevaluatetheperformanceof DCRA, simulations have been performed for different workload scenarios. The results show that the proposed algorithm can achieve reliable and cost-effective solutions using a dynamic combinationofreservedandon-demandresourcesfordeployingcloud-basedapplications.

The combination of solutions of both reservation and dynamic provision phases saves the total provisioning costs significantly. In addition, the proposed DCRA is cloud provider independent and can be used for major cloud providers such as AWS, Microsoft Azure, andGoGrid.

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A SECURITY MODEL FOR THE ENHANCEMENT OF DATAPRIVACYI NCLOUDCOMPUTING

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Abstract-As we all are aware that internet acts as a depository to store cyberspace data and provideas a service to its user. Cloud computing is a technology by internet, where a large amountof data being pooled by different users is stored. The data being stored comes from variousorganizations, individuals, and communities etc. Thus, security and privacy of data is ofutmostimportancetoallofitsusersregardlessofthenatureo fthedatabeingstored.Inthisresearch paper the use of multiple encryption technique outlines the importance of datasecurityandprivacyprotection.Also,whatnatureofattac ksandissuesmightarisethatmaycorrupt the data; therefore, it is essential to apply effective encryption methods to increasedatasecurity.
Keywords: Data Security, Privacy, Cloud Computing, Cyberspace, Data Encryption, RSA, Cryptography.

1. INTRODUCTION

Cloud computing is a very vast and rapidly emerging technology. It may have different meanings for different individuals but the common characteristic that brings different individuals together is the high availability of data at any time and at any place. Cloud computing not only reduces the role of local computers but also makes computing more integrated. In addition, Software as a Service is a software delivery model in which a third party provides host applications to the organizations and makes them accessible over the internet. Also, SaaS reduces the need for organizations to individually install and run applications on their own computers. This property of SaaS eliminates the cost of installation and support, software licensing, maintenance, and hardware installation.

2. TECHNOLOGY USED

ENHANCEDRSA ALGORITHM:

RSA algorithm is asymmetric cryptography algorithm. Asymmetric actually means that it works on two different keys i.e. Public Key and Private Key.As the name describes that the Public Key is given to everyone and Private key is kept private. The idea of RSA is based on the fact that it is difficult to factorize a large integer. The public key consists of two numbers where one number is multiplication of two large prime numbers. And private key is also derived from the same two prime numbers. So if somebody can factorize the large number, the private key is compromised. Therefore encryption strength totally lies on the key size and if we double or triple the key size, the strength of encryption increases exponentially. RSA keys can be typically 1024 or 2048 bits long, but experts believe that 1024 bit keys could be broken in the near future. But till now it seems to be an infeasible task.

2.0. Existing System

- InExistingsystem,thedataishandledonly form one server.
- Ifmultipleserversareaccessingthedatafrommultipleclie ntsthenwearegettingdenialofservice,which can befurtherimproved

DISADVANTAGE OF EXISTING SYSTEM

- LessSecurity
- Pronetokeyword guessingattacks

3. LITERATURE SURVEY:

Title: Data Security and Privacy Issues in Cloud Computing
Author: Dean Chen, Hong Zao.
Year: 2012
Description:
Cloud computing turned into the most predominant innovation in recent years. This innovative technology provides services to the customers for software and hardware. One can state that distributed computing can blast the portable business. Cloud computing is a basic technology for sharing of resources on the internet. Virtualization is a central innovation for empowering cloud resource sharing. Confidentiality of data storage is the essential alarm for assurance of data security so cloud computing does not provide robust data privacy. All details of data migration to cloud remain hidden from

the customers. The problem in cloud computing environments are security of cloud computing. In this exploration we tended to the difficulties in fulfilling of cloud computing environment regarding security hazard implementation strategies on cloud computing environment and comparison of different cloud computing architecture through comparative study. In this paper a survey of the different security hazards that represent a danger to the cloud is presented. This paper is a review more particular to the different security issues that has radiated because of then a nature of the administration conveyance models of a cloud computing framework.

Title: License plate verification method for automatic license plate recognition systems

Author: Rajat Sony, Smrute Ambakar , Dr. Paritosh Bansal

Year:2012

Description:

Recent advances have given rise to the popularity and success of cloud computing. However, when outsourcing the data and business application to a third party causes the security and privacy issues to become a critical concern. Throughout the study at hand, the authors obtain a common goal to provide a comprehensive review of the existing security and privacy issues in cloud environments. We have identified five most representative security and privacy attributes (i.e., confidentiality, integrity, availability, accountability, and privacy-preservability). Beginning with these attributes, we present the relationships among them, the vulnerabilities that may be exploited by attackers, the threat models, as well as existing defense strategies in a cloud scenario. Future research directions are previously determined for each attribute.

Title: Data Security and Privacy in Cloud Computing.

Author: Yunchan Sun, Junsheng Zang, Yogping Xong

Year: 2014

Description:

Data security has consistently been a major issue in information technology. In the cloud computing environment, it becomes particularly serious because the data is located in different places even in all the globe. Data security and privacy protection are the two main factors of user's concerns about the cloud technology. Though many techniques on the topics in cloud computing have been investigated in both academics and industries, data security and privacy protection are becoming more important for the future development of cloud computing technology in government, industry, and business. Data security and privacy protection issues are relevant to both hardware and software in the cloud architecture. This study is to review different security techniques and challenges from both software and hardware aspects for protecting data in the cloud and aims at enhancing the data security and privacy protection for the trustworthy cloud environment. In this paper, we make a comparative research analysis of the existing research work regarding the data security and privacy protection techniques used in the cloud computing.

Title: Data Security in Cloud Computing.

Author: T.V. Sathyanaryana, L Mary Sheela

Year: 2013

Description:

Data security has been incumbent on the cloud service providers, and they have risen to the occasion. No matter which platform you select in the debate between AWS vs. Azure vs. Google, all sport various compliances to standards like HIPAA, ISO, PCI DSS, and SOC. However, just because the providers offer compliance doesn't give customers the right to abdicate their responsibilities. They have some measure of responsibility as well, which creates a significant cloud computing challenge. So here are eight critical concepts for data security in the cloud.

Title: Remote data checking using provable data possession

Author :Peterson

Year: 2011 Description:

PDP that can be used for remote data checking: A client that has stored data at an untrusted server can verify that the server possesses the original data without retrieving it. The model generates probabilistic proofs of possession by sampling random sets of blocks from the server, which drastically reduces I/O costs. The client maintains a constant amount ofmetadata to verify the proof. The challenge/response protocol transmits a small, constant amount of data, which minimizes network communication. Thus, the PDP model for remote data checking is lightweight and supports large data sets in distributed storage systems.. Experiments using our implementation verify the practicality of PDP and reveal that the performance of PDP is bounded by disk I/O and not by cryptographic computation. Finally, we conduct an in-depth experimental evaluation to study the tradeoffs in performance, security, and space overheads when adding robustness to a remote data checking scheme.

• In this paper the use of multiple encryption technique outlines the importance of data security and privacy protection.
• Also, what nature of attacks and issues might arise that may corrupt the data

ADVANTAGE OF PROPOSED

• High Security
• Multiple levels of access and security.

4. IMPLEMENTATION

Cloud computing is a very vast and rapidly emerging technology. It may have different meanings for different individuals but the common characteristic that brings different individuals together is the high availability of data at any time and at any place. Cloud computing not only reduces the role of local computers but also makes computing more integrated. In addition, Software as a Service is a software delivery model in which a third party provides host applications to the organizations and makes them accessible over the internet.

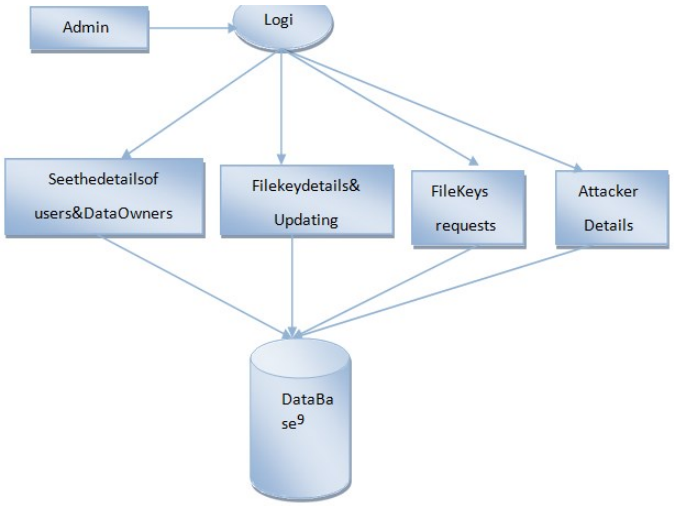
5. MODULES NAME:

- User Interface Design
- Admin
- Data Owner
- CSP
- User

MODULES DESCRIPTION

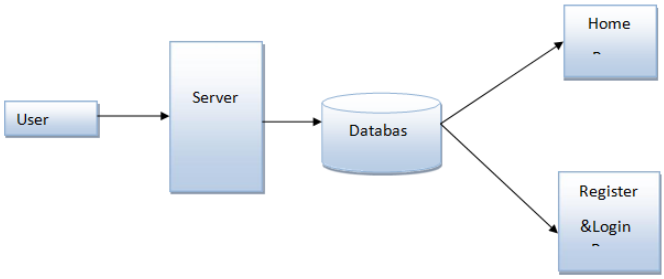
1. User Interface Design

In this module we design the windows for the project. These windows are used for secure login for all users. To connect with server user must give their username and password then only they can able to connect the server. If the user already exits directly can login into the server else user must register their details such as username, password and Email id, into the server. Server will create the account for the entire user to maintain upload and download rate. Name will be set as user id. Logging in is usually used to enter a specific page.



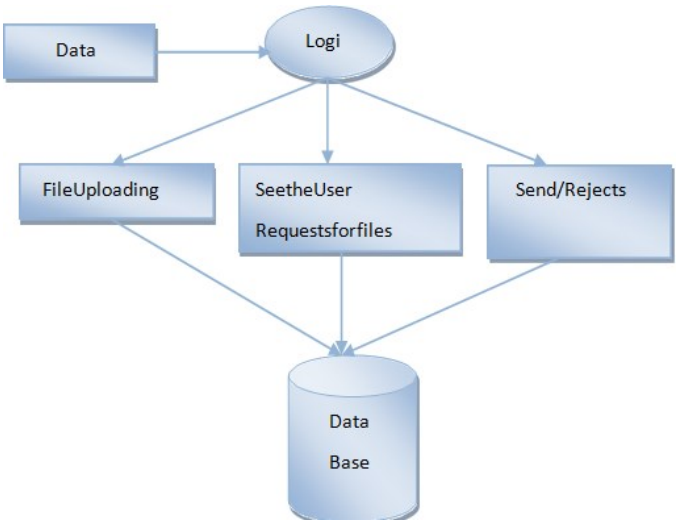
2. Admin

This is the second module of this system. In this module admin can login. Admin will see the details of data owners and users. Admin has information about files, and he need to protect the keys from attacker by updating the file keys regularly. Admin need to approve the file request from user and send to data owner to give permission to access the files. Admin will see the attacker details, users who will access the files without data owner permission.



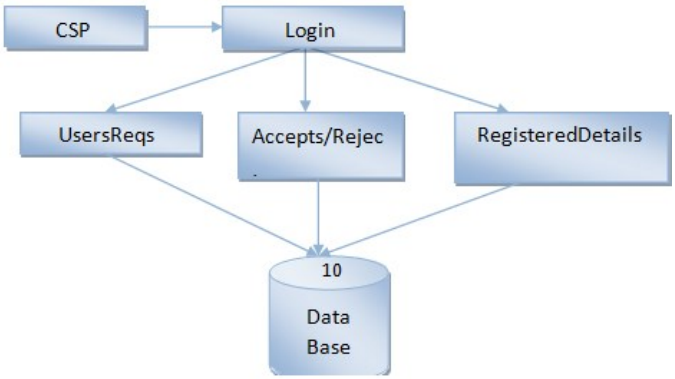
3. Data Owner

This is the third module of this system. In this module data owner should login. Data owner will upload the files. Those files are split into multiple parts and then double encrypted and stored into the database. If any user want to access that files then dataowner need to provide the keys for that file. If admin accept the users request to access the file then data owner will provide the keys for that file.



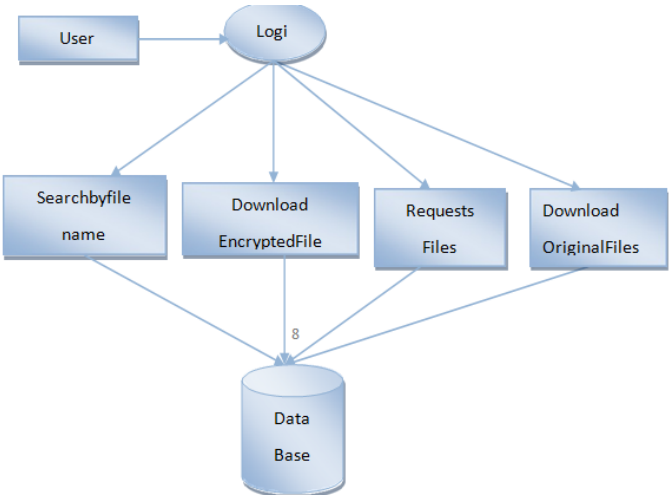
4. Cloud Service Provider

This is the fourth module of the system. In this module file uploaded by the data owner will split into multiple parts, then first the content will encoded in the network, then it will undergo RSA encryption, then again that encrypted data is encoded, and then store in the database. And admin need to modify the keys to protect the data from the attackers. He will alter the key size also.



5. User

This is the fifth module of this system. In this module user need to register and then login. Then user can search the files based on the file name. If the file exist it will display, else it show the message that file not exist. The file available, then user will download the file, which is double encrypted format. So, then user required the keys to decrypt the file. So, user will send the request to provide the keys. Then admin will accept his request. Some updated keys will display to the user, at the time user try to download original file multiple times then user treated as attacker. Data owner will provide the keys for file then user can download the original file.



6. CONCLUSION

Since the introduction of a technology like cloud computing and the fast pace developments happening somewhat regularly, storing data using cloud storage has become more prone to data theft, un-authorized access, DoS attacks etc. As most of the organizations are using cloud computing as a data storage medium which can easily be accessed by cyber criminals as the existing cryptographic algorithms have single level encryption. But, here in the proposed model, it provides multi-level encryption which isn't easy to crack as an unauthorised user would need the encryption keys as well as the decryption keys in order to view or obtain data which would automatically become a difficult task to accomplish without a valid key. It is expected that using multilevel encryption with deliver more safety to data for cloud storage than by means of single level encryption.

7. FUTURE ENHANCEMENTS

Issues like security of data in terms of data lineage and data reminisce are the most likely fields to be worked on in future as they provide and act as crucial authors when it comes to track the movements of data over the cloud and the digital residual representation of data which is an outcome when someone might have tried to erase or remove the data. Also, since lightweight cryptography helps in security of sensor networks, smart devices or IoT devices, it has become essential to introduce algorithms that may provide more data reliability, data confidentiality, data integrity and most decisively data security at all intervals.

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PROFIT MAXIMIZATION FOR CLOUD BROKERS IN CLOUD COMPUTING

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Abstract-A long with the development of cloud computing,moreapplicationsaremigratedintothecloud. Animportantfeatureofcloudcomputing is pay-as-you-go. However, most users always should pay morethan their actual usage due to the one-hour billing cycle. In addition, mostcloud service providers provide a certain discount for long-term users, butshort-term users with small computing demands cannot enjoy this discount.To reduce the cost of cloud users, we introduce a new role, which is cloudbroker. A cloud broker is an intermediary agent between cloud providers andcloud users. It rents a number of reserved VMs from cloud providers with agood price and offers them to users on an on-demand basis at a cheaper pricethan that provided by cloud providers. Besides, the cloud broker adopts ashorter billing cycle compared with cloud providers. By doing this, the cloudbroker can reduce a great amount of cost for user. In addition to reduce theuser cost, the cloud broker also could earn the difference in prices betweenon-demand and reserved VMs. In this paper, we focus on how to configure acloud broker and how to price its VMs such that its profit can be maximizedon the premise of saving costs for users. In this paper, we firstly give asynthetically analysisonall theaffectingfactors,anddefineanoptimalmulti server configuration and VM pricing problem which is modeled as aprofit maximization problem. Secondly, combining the partial derivative andbisectionsearchmethod,weproposeaheuristicmethodto solvetheoptimization problem. The near-optimal solutions can be used to guide theconfiguration and VM pricing of the cloud broker. Moreover, a series ofcomparisonsaregivenwhichshowthatacloudbrokercansa veaconsiderablecostforusers.

Keywords:Cloud Computing, Cloud Brokers, Discount, Profit, Price, Cost Virtual Machine.

1. INTRODUCTION

More and more cloud providers have jumped on the cloud bandwagon, and they centrallymanage a variety of resources such as hardware and software and deliver them over theinternet in the form of services to customers on demand. Thanks to unique propertiessuch as elasticity, flexibility, apparently unlimited computational power, and pay-as-you-use pricing model,cloudcomputing canreduce the requirementof clientsfor largecapital outlays for hardware necessary to deploy service and the human expenses tooperate it. Hence, an increasing number of clients are transferring their business to thecloud. One important feature of cloud computing is pay-as you- use ,which contains twomeanings. First, according to the customer resource demand such as CPU, memory, etc.,the physical machines are dynamically segmented using virtualization technologies andprovidedtocustomersintheformofvirtualmachines(VMs),andcustomerspayaccording to the amount of resources they actually consumed. Second, the VMs can bedynamically allocated and de-allocated at any time, and customers should pay based onhow long the resources are actually used. Nevertheless, the pay-as-you-use pricing modelis presently only conceptual due to the extreme complexity in monitoring and auditingresource usage and cloud providers usually adopt an hourly billing scheme; in otherwords, the Billing Time Unit (BTU) of the cloud providers is one hour, for instance,Amazon EC2. Therefore, the customers should pay for the resources by the hour even ifthey do not actually utilize the allocated resources in the whole billing horizon .This leadsto a waste of resources and raises the cost of customers to a certain degree. In addition,almost all cloud providers provide two main ways to pay for their instances: On-Demandand Reserved Instances .With On-Demand instances, users pay for compute capacity byper hour depending on which instances they run, and they are recommended for theapplicationswithshort-termworkloads.ReservedInstancesprovideuserswithasignificant discount (up to 75% in Amazon EC2) compared to On-Demand instancepricing, but customers should rent

instances for long periods, e.g., from six months toseveralyears,accordingtothecurrentplansofferedbyrealcloudproviderssuchas Amazon and Microsoft Azure .Obviously, this discount cannot be enjoyed by the short-termcustomers.

2. TECHNOLOGY USED

M/M/n/n queue model

In this M/M/n/n queuing model, the arrival of VM requests is assumed to be a Poissonstreamwitharrival rate λ(measuredbythenumberofrequestsper unitoftime).The queuing system considered is essentially a M/M/N/N queue where two types of users compete for the resources. The users may have different arrival and service rates and are denoted as primary or secondary users. The primary users have priority access to the resources, and three levels of priority are considered: perfect priority, partial priority, and no priority. This system models the recently developed cognitive radio concept, a methodology that has been proposed for future mobile radio systems

Existing System

- Animportantfeatureof cloudcomputingispay-as-you-go.
- However,inexitingsystemmostusersalwaysshould paymorethantheiractualusageduetothe one-hour billingcycle.
- In addition, most cloud service providers provide a certain discount for long-term users, but short-term users with small computing demands cannot enjoy this discount

DISADVANTAGE OF EXISTING SYSTEM

- Serviceperformances,total cost,and loadbalancingarenotaddressed.
- Properallocationoftherequestedservicesisnotguaranteed.

LITERATURE SURVEY:

TITLE : Maximizing profit of cloud brokers under quantized billing cycles: a dynamicpricingstrategybased onski-rental problem

AUTHOR:GouravSahaandRamkrishnaPasumarthy.

YEAR:2015

DESCRIPTION :

In cloud computing, users scale their resources(computational) based on their need.There is massive literature dealing with such resource scaling algorithms. These worksignoreafundamentalconstrainimposedbyallCloudServiceProviders(CSP),i.e.onehas to pay for a fixed minimum duration irrespective of their usage. Such quantization inbilling cycles poses problem for users with sporadic workload. In recent literature, CloudBroker (CB) has been introduced for the benefit of such users. A CB rents resources fromCSP and in turn provides service to users to generate profit. Contract between CB anduseristhatofpay-what-you-use/pay-per-use.HoweverCBfacesthechallengeofQuantized Billing Cycles as it negotiates with CSP. We design two algorithms, one fullyonline and the other partially online, which maximizes the profit of the CB. The key ideais to regulate users demand using dynamic pricing. Our algorithm is inspired by the Ski-Rentalproblem.Wederivecompetitiveratiooftheseal gorithmsandalsoconductsimulationsusingreal world traces to provethe efficiencyof ouralgorithm

TITLE : Cloud brokering architecture for dynamic placement of virtual machines.

AUTHOR : Dheeraj Rane , Abhishek Srivastava

YEAR : 2015

DESCRIPTION :

Numerous service providers in the cloud market provide diverse services, at distinct price and level of competence. However, the concept of cloud computing is yet to reach many organizations and to the end users as well. With perspective of these organizations and end users, it is very difficult to choose one among many service providers. Further, adhering to only one provider will deprive these users of benefits from market diversity and fluctuating rates. Instead, having a broker be aware of the provider's service offerings and consumer's requirements, and managing the assignment under economic and technical constraints will benefit both ends of the service viz consumers and providers. In this work, a cloud resource broker is proposed that will govern the assignment of providers' resources to consumer dynamically. The proposed broker uses various requirements and constraints specified by the consumer in the requirement description template as input, to calculate aggregated requirements, using an aggregation algorithm. Further, the service scheduling algorithm is defined to find an optimized match between the aggregated requirements with the providers offerings. Thereafter, this algorithm is executed frequently, based on a strategy for dynamic scheduling to benefit consumers on account of introduction of new provider or some good offerings. Results show that the solution provided by broker proves to be a win-win situation for the consumer with respect to cost as well as performance.

TITLE:Greencloudbroker:On-linedynamicvirtualmachineplacementacrossmultipleclou d providers.
AUTHOR :FedericoLarumbeandBrunilde Sans.
YEAR:2016
DESCRIPTION :
Cloudcomputingcontrolstheincreasingenergyconsumptio nofapplicationsbyconsolidating them in shared servers through virtualization. This technique can be greatlyimprovedandcomplementedbychoosinganoptimal datacenterforeachVirtualMachine (VM). That dynamic optimization problem was stated as a Mixed Integer LinearProgramming (MILP) model that minimizes operational expenditures, while respectingconstraintsonQualityofService(QoS),powercon sumption,andCO2emissions.Geographically distributed users experience varying response times depending on whereusers and VMs are located. Users closer to VMs experience a shorter response time, thusdistributing VMs close to users improves the QoS. On the other hand, the increasingenergyconsumptionofthecloudraisedconcernsa bouttheimpactonCO2emissionsand global warming. Placing VMs in data centers that use green energy sources is animportantwaytomitigatethisproblem.Acomprehensiveo ptimizationmodellingframework and an efficient tabu search heuristic were developed to handle applicationswithdynamicdemandsinrealtime.Testcasesha dmorethan1,000nodes,650applications, and 6,500 VMs. Results report that the communication delay is reduced upto 6 times, 30% of power consumption is saved, and the CO 2 emissions can be reducedup to 60 times. The framework also allows to carefully assess the trade-offs betweendelay,cost, CO 2 emissions and powerconsumption.
TITLE:Online resourceschedulingunder concavepricingfor cloudcomputing.
AUTHOR:RuiZhang,KuiWu, MinmingLi,andJianpingWang.
YEAR:2016
DESCRIPTION :
With the booming growth of cloud computing industry, computational resources arereadily and elastically available to the customers. In order to attractcustomers withvarious demands, most Infrastructure-as-a-service (IaaS) cloud service providers offerseveral pricing strategies such as pay as you go, pay less per unit when you use more (socalledvolumediscount),andpayevenlesswhenyoureserv e.Thediversepricingschemes among different IaaS service providers or even in the same provider form acomplex economic landscape that nurtures the market of cloud brokers. By strategicallyscheduling multiple customers' resource requests, a cloud broker can fully take advantageof the discounts offered by cloud service providers. In this paper, we focus on how abroker may help a group of customers to fully utilize the volume discount pricing strategyoffered by cloud service providers through cost-efficient online resource scheduling. Wepresent a randomized online stack-centric scheduling algorithm (ROSA) and theoreticallyprove the lower bound of its competitive ratio. Our simulation shows that ROSA achievesa competitive ratio close to the theoretical lower bound under a special case cost function.Trace driven simulation using Google cluster data demonstrates that ROSA is superior totheconventional online schedulingalgorithms in termsof cost saving.
TITLE:Efficientheuristics forprofitoptimizationofvirtual cloudbrokers.
AUTHOR:SNesmachnow,SIturriaga, andBDorronsoro.
YEAR:2015
DESCRIPTION :
This article introduces a new kind of broker for cloud computing, whose business relieson outsourcing virtual machines (VMs) to its customers. More specifically, the brokerowns a number of reserved instances of different VMs from several cloud providers andoffers them to its customers in an on-demand basis, at cheaper prices than those of thecloud providers. The essence of the business resides in the large difference in pricebetweenon-demandandreservedVMs.WedefinetheVirtualMachinePla nningProblem,anoptimizationproblemtomaximizetheprof itofthebroker.Wealsoproposea number of efficient smart heuristics (seven two-phase list scheduling heuristics and areorderinglocalsearch)toallocateasetofVMrequestsfrom customersintotheavailable pre-booked ones, that maximize the broker earnings. We perform experimentalevaluation to analyze the profit and quality of service metrics for the resulting planning,includingasetof400probleminstancesthataccoun tforrealisticworkloadsandscenariosusingreal datafrom cloud providers.

3. PROPOSED SYSTEM

- To reduce the cost of cloud users, in this paper we introduce a new role, which iscloudbroker.
- Acloudbroker isanintermediaryagentbetweencloudprovidersandcloudus ers.
- It rents a number of reserved VMs from cloud providers with a good price andoffers them to users on

an on-demand basis at a cheaper price than that providedbycloud providers

PROPOSED SYSTEM ADVANTAGE

- Lowerservicepriceandthefiner-grained output.
- Guidescloud brokerson howtoconfiguretheresourceplatform properly

4. IMPLEMENTATION

Oneimportantfeatureofcloudcomputingispay-asyou-use,whichcontainstwomeanings. First, according to the customer resource demand such as CPU, memory, etc.,the physical machines are dynamically segmented using virtualization technologies andprovidedtocustomersintheformofvirtualmachines(VMs),andcustomerspayaccording to the amount of resources they actually consumed. Second, the VMs can bedynamically allocated and de-allocated at any time, and customers should pay based onhow longtheresources areactuallyused

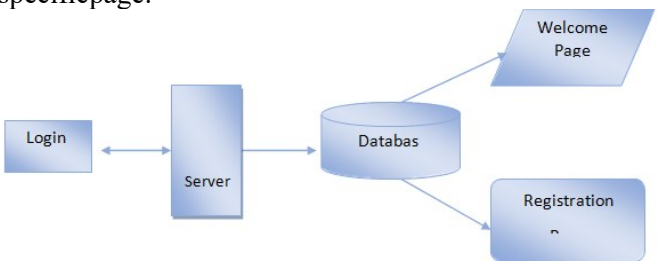
MODULES NAME:

- User Interface Design
- Admin
- Cloud
- Virtual Machine
- User

MODULES DESCRIPTION

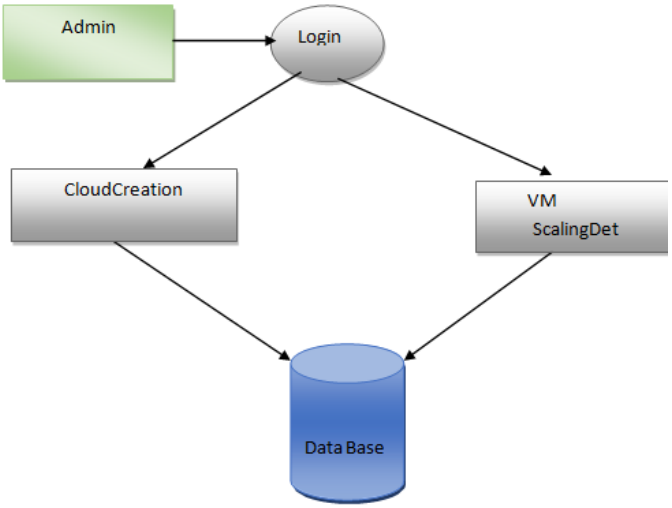
1. User Interface Design

In this module we design the windows for the project. These windows are used for securelogin for all users. To connect with server user must give their username and passwordthen only they can able to connect the server. If the user already exits directly can logininto the server else user must register their details such as username, password and Emailid,intotheserver.Serverwillcreatetheaccountforthee ntireusertomaintainuploadand download rate. Name will be set as user id. Logging in is usually used to enter aspecificpage.



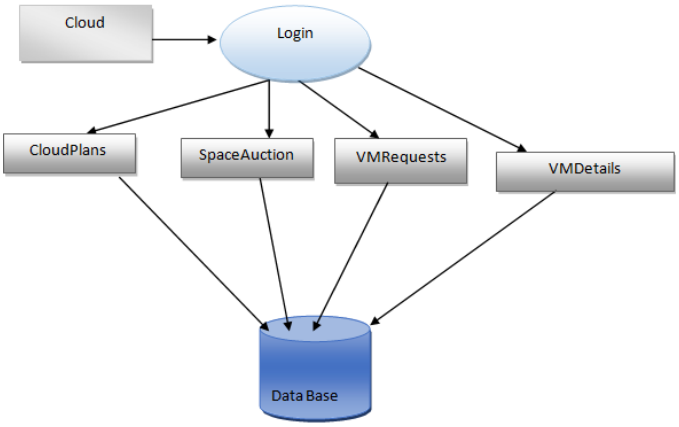
2. Admin

This is the first module of this project. In this module initially admin need to login. Thenadmin will create the cloud with some space. And he will manage the cloud details likehow many VM instances create to a cloud and how many resources that are providing bythe cloud. And admin will manage the VM scaling details. That means how many usersareavailable and how theyareutilizingthe VM.



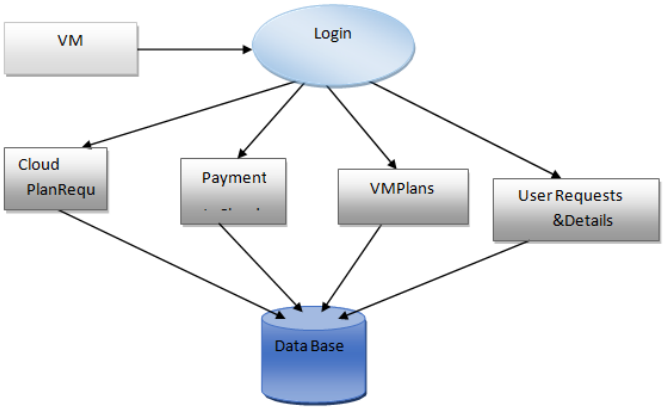
3. Cloud

This is the second module of this project. In this module initially cloud owner need tologin. Then he will verify the VM requests to allocate the space and resources. If any VMuser wants upgrade their plans that will approval. And online auction for increasing thespace of VM between differentusers and then who will pay more amounts then spacewill allocate those VM users. And VM can be removed if the expiry date completed toutilizethe spacein that particular cloud.



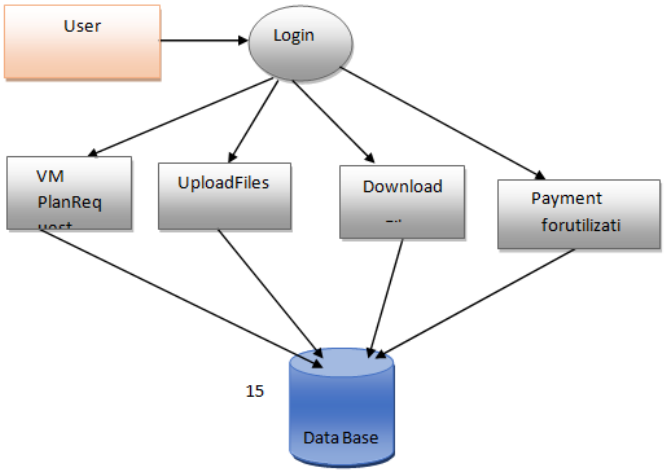
4. Virtual Machine

This is the third module of this project. In this module initially VM owner need to login.Then he will verify the request of resource from different users while they are registering.Ifheapprovedthenusercanutilizethespacebypaying themoneybasedonhisutilization. If the space or expiry date of VM occurs it need to reclaim his space by onlineauction.Andanyuserbillsneedtomaintain.Andresourceupgradationneedstomaintain.



5. User

This is the fourth module in this project. In this module initially user need to login. Thenuser can share store the data based on the size. Depending the resource user need to paythe amount to the VM Owner. If user wants to upgrade his resource he can upgrade bypaying required amount. If user wants change the VM resource he can his resource tootherVM which will provide better resources.



5. CONCLUSION

We focus on the profit maximization problem of cloud brokers. A cloud broker is anintermediary entity between cloud service providers and customers, which buys reservedinstances from cloud providers for long periods of time and outsources them as on-demand VMs for a lower price and fine-grained BTU with respect to what the cloudservice providers charge for the same VMs. Due to the lower service price and the finer-grained BTU compared with the public clouds, the cloud broker can save much cost forcustomers.Thispapertriestoguidecloudbrokersonhowto configurethevirtualresource platform and how to price their service such that they can obtain the maximalprofit. To solve this problem, the virtual resource platform is modeled as an M/M/n/nqueue model, and a profit maximization problem is built in which many profit-affectingfactors are analyzed based on the queuing theory, as well as the relationship betweenthem. The optimal solutions are solved combining the partial derivative and bisectionmethod. Lastly, a series of calculations are conducted to analyze the changing trend ofprofitand the ratio of user cost savings.

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A RESUME EVALUATION SYSTEM BASED ON TEXT MINING

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ABSTRACT:This study explored the application of interview robots onrecruitment process. By adopting techniques including webcrawling, text mining, and natural language processing, this studydeveloped an effective system that matches job candidates withrecruiters. The designed system analyzed electronic résumés inTraditional Chinese, on which the words were graded according tothe job market on the Internet and implemented with techniquesrelated to big data. The results demonstrated that the designedsystem identified the current demand on talent-seeking and quicklypresented candidate rankings for a specific position, therebyfulfilling the needs of both job-hunting candidates and talent-seekingrecruiters.
Keywords: Text Mining, Web crawling, natural language, Job, Recruiters, Electronic resume.

1. INTRODUCTION

Artificial intelligence (AI) technology is developing rapidly and is quickly becoming apart of daily life. AI can be adopted to help people in the workplace. For example, AI canbe used to assist interviewers. Applying AI in interviews is advantageous because an AIinterviewerdoesnottreatinterviewees differentlybecause ofpersonal,mental,orphysicaltraits orother externalconditions, unlike humaninterviewers [1].

During interviews, interviewers tend to make unscientific or irrational decisions becauseof their subjective views and personal emotions; consequently, the opportunity to hiretalented individuals can be missed. Because hiring an excellent staff is critical for thesuccessofafirm,allenterprisesstrivetodiscoverandhirepeoplewithconsiderabletalent and potential. Additionally, when job applicants contact any human resources (HR)department or employer, they can generally recognize whether the company is concernedaboutfairlytreatingeachapplicant.Theperceived leveloffairnesscancreateanimpression, good or bad, of the company in the mind of an applicant. Such impressionscanleadtoacceptanceor rejectionof anofferof a second-round interview,andthusaffecttheopportunityforthecompanytorecruitandhiretopcandidates[2].Furthermore, candidates, including top candidates, can be affected by their physical andmentalstatusonthedateofinterview.Theycanbenervous andunderperformorexperience stage fright; consequently, they may be overlooked by interviewers despitetheir considerable abilities. Besides, a conventional interview is limited by time andlocation, leading to the waste of resources by employers and interview rejections bypotentialcandidates.

To solve this HR problem, businesses have begun to incorporate AI into HR tasks, givingrise to AI-based job matching. Gartner, a global research and advisory firm, indicated thatroughly 1.8 million jobs will be replaced by AI by 2020; however, AI will also create 2.3millionjobsthat expandthe labormarket [3].Similar tomajorpast laborrevolutions, AImayleadtotechnology-relatedunemployment,butitmayalsopromptindustrialtransformation.Althoughmillionsof low–midleveljobsmightbe replaced by AI, AIwill likely create more positions, including high-tech jobs, management positions, andevenentry-level and low-tech jobs of adifferent nature.

This study developed an AI-based interviewing system to reduce the loss of talent causedby the emotional reactions and subjectivity of interviewers when viewing résumés. Thedesigned system performs the function of résumé assessment and explores the personalitytraits of candidatesbyclassifying them into four dimensions of soft power, namelydominance, influence, steadiness, and compliance (DISC) after assessing the submittedelectronic résumés. This system also assesses three dimensions of competence, namelyeducationandexperience,skills,andpersonalitytraits,whichareindicatedbytheinformationcontainedinarésumé (e.g.,education,experience,specialties,andautobiography). The system examines the aforementioned data by

collecting the currentjob market demands on the internet, performing Chinese natural language processing, andanalyzing the big data relevant to the position in question. The results of this examinationcan help determine the quality of the match between job applicants and a business.Finally,thedesignedsystemquantifiestheaforementionedDISCdataandthreecompetency dimensions by scoring each résumé. The results are then compiled into areportthatcontainsthepersonalanalysis,ranking,anddistribution forecastforthecandidatein question.

2. EXISTINGSYSTEM

In this they have used Web Crawler, This algorithm uses text mining to collect, analyze,and visualize local job data. The authors used web crawlers, keyword analysis, and aprogramwrittenintheRlanguage for data analysisandvisualizationtomatchjobapplicants with businesses. These technologies could help vocational and educationalinstitutions to develop talent. During interviews, interviewers tend to make unscientific orirrationaldecisionsbecauseoftheirsubjectiveviewsandpersonalemotions;consequently, the opportunity to hire talented individuals can be missed. A conventionalinterview is limited by time and location, leading to the waste of resources by employersandinterview rejectionsby potential candidates.

EXISTINGSYSTEMDISADVANTAGES

- Timetaking
- Lossofpotentialcandidates
- Morenumberofresources arerequired forevaluation.

LITERATURESURVEY:

Title: Discovering Job Market Trends with Text Analytics.
Author:RaymondBlanchMbah,ManjeetRege,BhabaniMisra.
Year:2018
Description:
Dueto thecurrent dynamicand competitivenatureofjob marketsespecially the ITjobmarket,ithasbecomeincumbentfororganizations andbusinessestostayinformedaboutthe current job market trends. Staying current with trends entails collecting and analyzinghuge amounts of data which in the past, has always involved a great deal of manual work.In this paper, we present out work on collecting, analyzing and visualizing local job datausing text mining techniques. We also discuss technologies used such as: cron jobs forautomation; Java for API data collection and web scrapping, Elastic search for datasubsetting and keywordanalysis, and R for dataanalysis and visualization. We expectthis work to be of relevance to a diverse range of job seekers as well as employers andeducationalinstitutions.

Title: Research on Information Collection Method of Shipping Job Hunting Based onWebCrawler.
Author: Dongcheng Peng,Tieshan Li,Yang Wang,C.L. PhilipChen.
Year: 2018
Description:
In recent years, with the increasing development of Artificial Intelligence, Big Data andCloud computing, etc., the information on the Internet has been booming, so how toobtain target information efficiently and quickly has become an urgent problem to besolved. This article aims at the data collection and acquisition problem of shipping jobhuntinginformationunderthenetworkenvironment.Inthisstudy,twokindsofinformationcollectionmethodsforshippingjobhuntingbasedonwebcrawlerareproposed.BasedontthePythonstandardlibrariesandScrapycrawlframework,corresponding web crawler program is designed and implemented to scrape the targetinformation from target website and store the collected data into local file eventually.Through the amount of data crawled and time consuming comparative analysis, the resultdemonstratesthatthedatacollectionmethodbased ontheScrapy crawlerframeworkissimpletooperate,easilyextensible,featuringbeingtargeted,withhighefficiencyandfast speed in collecting shipping job hunting information. Fortunately, the collected datacan not only help researchers conduct subsequent data mining analysis, but also canprovidedata support forthefollow-up shipping jobhunting information database.

Title: Simplified Recruitment Model Using Text-Mining on Psychometric and AptitudeTests.
Author:ShreyaSawleshwarkar,NishaRangnani, VijetaMariwalla,Aparna Halbe
Year: 2018
Description:
Inthepresentdayworkingscenario,jobrecruitmenthasbecomeatime-consumingprocess for the HR department. Not only that, the results of the prevailing recruitmentsystemareoftenunsatisfactory,asreflectedinthefrequentjobchanges,employeedissatisfaction and overall inefficiency. Through the proposed model, we plan to simplifyand automate the process with an additional stress of psychometric tests. Psychometrictests prove to be useful in mapping the personality, aptitude and qualities of candidateswith the jobs they are applying for.

Text mining is performed on the answers, based on ascoring mechanism that serves to produce a shortlist for a given job. This model can workforseveral recruitment areas and jobs, as need be.

Title: VR Job Interview Simulator: Where Virtual Reality Meets Artificial IntelligenceforEducation.

Author: Iulia Stanica, Maria-Iuliana Dascalu, Constanta Nicoleta Bodea, Alin DragosBogdanMoldoveanu.

Year:2018

Description:

Nowadays,peoplehavetofacemanychallengeswhengoingtoaninterview:introversion,insecurity,lackoftechnicalorsocialskills.Trainingbecomeshighlyrecommended inorder to improve interview performances.The currentpaper presentsVR Job, an application which proposes an innovative way of training for an interview. Bycombiningtheadvantagesofvarioustechnologies,suchas virtualrealityandchatbots,our application creates an interactive way of helping software engineers train for theirinterviews. Emotion recognition techniques are also included, helping provide accuratefeedbackfortheuser.

Title:MiningforComputingJobs

Author:AndrewAken,ChuckLitecky,AltafAhmad, JimNelson

Year: 2009

Description:

A Web content mining approach identified 20 job categories and the associated skillsneedsprevalentinthecomputingprofessions.UsingaWebcontentdataminingapplication,weextractedalmostaquartermillionuniqueITjobdescriptionsfromvarious job search engines and distilled each to its required skill sets. We statisticallyexaminedthese,revealing20clustersofsimilarskillsetsthatmaptospecificjobdefinitions.Theresultsallowsoftwareengineeringprofessionalstotunetheirskillsportfolio to match those in demand from real computing jobs across the US to attain morelucrativesalaries and moremobility in achaoticenvironment.

Title:AutomatedCVprocessingalongwithpsychometricanalysisinjobrecruitingprocess

Author:FirozAhmed,MehrinAnannya,TanvirRahman, RisalaTasinKhan

Year: 2015

Description:

In this paper we have proposed automated job recruiting process along with psychometricanalysis.Herethefocushasbeengiveninautomatingthejobapplyingand CVprocessing system. A social networking website for the job seekers and employers isproposed to develop which will forward CV to the desired company or organizationsautomatically by matching the required criteria instead of traditional job searching andapplying process. With the help of the website, the job organizations would be able tochoose the efficient and right person for the right job among the applicants on the basis ofPsychometricanalysisandalsoitwillincreasethe jobsatisfactionamongtheemployees.

Title:ResumeParser:Semi structuredChineseDocumentAnalysis

Author:ZhangChuang,WuMing,LiChunGuang,XiaoBo,LinZhi-qing

Year:2009

Description:

Semi-structuredChinesedocumentanalysisisthemostdifficulttaskforcomplexstructure and Chinese semantics. According to the generic characteristics of the semi-structured document and the specific characteristics of the resume document, the paperresearched on resume document block analysis based on pattern matching, multi-levelinformation identification and feedback control algorithms was also prompted. Based onthe research, resume parser system was implemented for China HR, which is the biggestrecruitmentWebsite.Itcanread,analysis,retrievalandstoretheinformationautomatically. According to all kinds of experiments results, the accuracy and efficiencyof this system can generally satisfy the practical requirements. As the research on theprocessingofthe semi-structured document,it will not onlybeas adirectiveof thefurther research on the resume analysis, but also be as the reference to other form of thesemi-structureddocument.

3. PROPOSEDSYSTEM

In this paper, we propose Dominance, Influence, Steadiness, and Compliance (DISC). Thesystem collects phrases related to the DISC traits and three competency dimensions to build abasis for quantification and scoring in later stages. The designed system delivers visualized datareports to users after performing big data computation. During interviews, interviewers tend tomake unscientific or irrational decisions because of their subjective views and personalemotions; consequently, the opportunity to hire talented individuals can be missed. Tosolve HR problem, businesses have begun to incorporate AI into HR tasks, giving rise toAI-based job matching. Our AI-based interviewing system to reduce the loss of talentcausedbytheemotionalreactionsandsubjectivityofinterviewerswhenviewingresumes.

PROPOSEDSYSTEMADVANTAGES

- Limitedresourcesaresufficient.
- Easytouseandevaluation processrequiresmuchlesstime.

4. IMPLEMENTATION

This study aimed to effectively score résumés. The resulting reports can then serve as areference for HR departments or employers. Furthermore,job applicants canbenefitbecause the system can prevent unfair treatment during an interview. The system not onlysavesbusinesses personnelcostsbutalsomitigates the limitationsof time and spaceusing the Internet. The designed system produces a final report that is delivered to boththe job recruiting company and job applicant and can serve as a reference for both partiesto understand each other's needs, thereby facilitating achievement of a win–win situation.Because information technologies (ITs) such as AI, big data, and cloud computing arethriving, IT jobs are particularly competitive in the current employment market. Firmsmust understand the current employment market. Adopting effectiveapproaches thatenablefirmstoquicklyacquiretargetedinformationisess entialbecauseonlineinformation is increasingly abundant. Researchers can perform language processing andanalysis on the data collected by a web crawler. For example, Peng et al. adopted theweb-crawling framework Scrapy and designed a web-crawling program that was used tocollect recruitment data concerning the shipping industry. Such a program is an ideal toolforresearchers to conduct relevant analyses in thefuture.

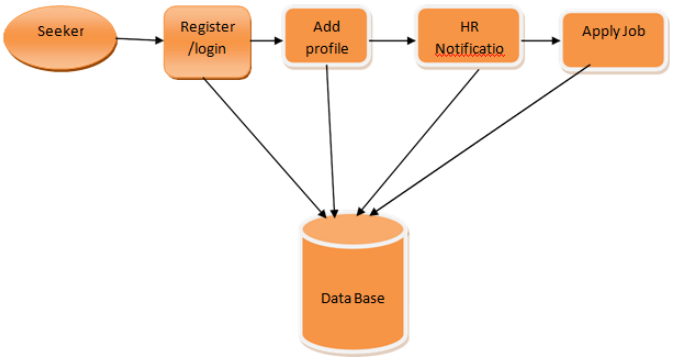
METHODOLOGIES

MODULES

- Seeker
- HR
- Admin
- Robot

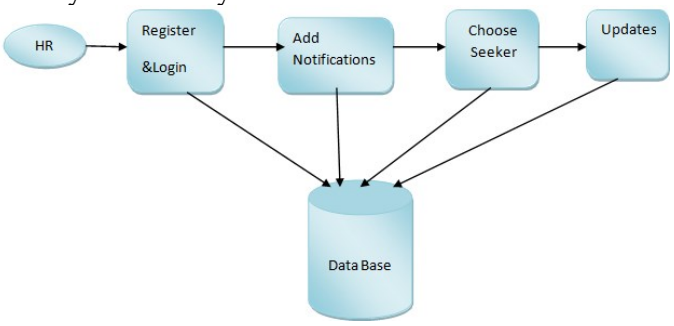
Seeker:

A seeker first need to Register and Login with a valid mail –Id and password. ThanSeeker need to give profile. Seeker can able to see all notifications of HR and Seeker canapplywhich is suitableto they own profile. Seekers will get replyfrom HR.



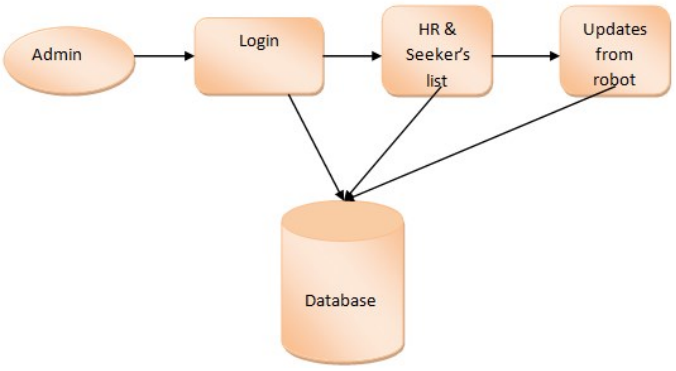
HR

First hr need to register and hr can able to add notifications. Hr can able to see allSeekers list they can select which profile is suitable to they own requirements.Adminwillgive valid seeker'slistwhich is alreadyevaluated by Robot.



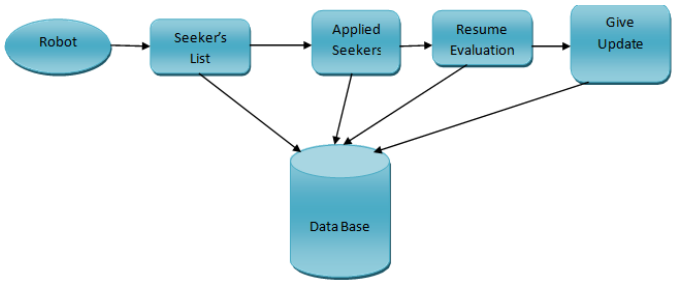
Admin

Anadminneedtologinandtheycanabletoseealltheinformati onaboutseekersandHR. Admin will getan information from Robot and Admin will give that update to HR,Whichmean Admin canact likeamediator in between Robotand HR.



Robot

This module is main module, because it's playing very important role in this project. TosolvethisHRproblem,businesseshavebeguntoincorpora teAIintoHRtasks,givingrise to AI-based job matching. Robot will evaluate the Resume's of Seekers. Robot willgiveupdates to Admin.



5. CONCLUSION

In the system designed in this study, computing is performed on the basis of two models,namely DISC and the three competency dimensions. After a résumé is processed usingthesetwomodels,thesystemproducesareal-timeonlinereportthatinformscandidatesoftheirsoftpowerat tributes(i.e.,DISCdimensions)andcompetencyrankingand shortcomings; this is a useful tool for self-evaluation. Recruiters can also understand jobcandidates through these online reports; the reports can serve as a reference for talentselectionand evaluation.

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FINGERPRINT IMAGE IDENTIFICATION FOR CRIME DETECTION

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ABSTRACT Fingerprint images in crime scene are important clues to solve serial cases. In this paper we present a complete crime scene fingerprint identification system using deep machine learning with Convolutional Neural Network (CNN). Images are acquired from crime scene using methods ranging from precision photography to complex physical and chemical processing techniques and saved as the database. The images collected from the crime scene are usually incomplete and hence difficult to categorize. Suitable enhancement methods are required for pre-processing the fingerprint images. Minutiae are extracted from the fingerprint images. The features of preprocessed data are fed into the CNN as input to train and test the network. The s2experimental results demonstrated on database using Open CV-Python shows high accuracy of 80% recognition an partial or full fingerprints in the criminal database.

Keywords: Crime scene images, Machine learning and Convolutional Neural Network.

1. INTRODUCTION

Fingerprints in the crime scene plays an important role to identify the criminal involved in the crime. Crime scene images (CSI) are images taken from the crime spot. When crime is occurred, the investigator takes both latent and patent sample of fingerprints left behind. The patent fingerprints are visible by naked eye, so they are simply photographed. But latent fingerprints [1] are invisible and these samples are more difficult to perceptible. These samples can be lifted through different techniques. In this paper it present a complete crime scene fingerprint identification system using deep machine learning with Convolutional Neural Network (CNN). Images are acquired from crime scene using methods ranging from precision photography to complex physical and chemical processing techniques and saved as the database.

2. LITERATURE REVIEW

Latent fingerprint has been used as evidence in the court of law for over 100 years. However, even today, a completely automated latent fingerprint system has not been achieved. Researchers have identified several important challenges in latent fingerprint recognition: 1) low information content; 2) presence of background noise and nonlinear ridge distortion; 3) need for an established scientific procedure for matching latent fingerprints; and 4) lack of publicly available latent fingerprint databases. The process of automatic latent fingerprint matching is divided into five definite stages, and this paper discusses the existing algorithms, limitations, and future research directions in each of the stages.

Fingerprint is the most well-known and successfully deployed biometric modality due to its ease of acquisition, established use, acceptance and high recognition rate (i.e., robustness). One form of fingerprint is called latent fingerprint. Despite its subtle appearance, latent fingerprint is commonly left all over the place unintentionally, including water tap, door knob, elevator button, and cup. To lift these latent fingerprints, the conventional approach involving the process of powdering and taping may physically damage the latent fingerprint. Therefore, a reduced contact method is desirable. This study focuses on latent fingerprints left on curved surfaces, such as water tap, door knob, and water flasks. The latent fingerprint is uncovered (i.e., made visible) by means of fuming, and the end product is captured by a camera. A geometrical compensation method, which takes the curvature of the surface as input, is formulated to geometrically correct (i.e., flatten) the image. The corrected image is further enhanced and sent for matching purpose. Experiments show that the application of the proposed geometrical compensation method is able to flatten the fingerprint image uncovered from a single directional curved surface and improve its matching score.

There are various types of applications for fingerprint recognition which is used for different purposes.

Fingerprint is one of the challenging pattern Recognition problem. The Fingerprint Recognition system is divided into four stages. First is Acquisition stage to capture the fingerprint image, The second is Pre-processing stage to enhancement, binarization, thinning fingerprint image. The Third stage is Feature Extraction Stage to extract the feature from the thinning image by use minutiae extractor methods to extract ridge ending and ridge bifurcation from thinning. The fourth stage is matching(Identification, Verification) to match two minutiae points by using minutiae matcher method in which similarity and distance measure are used. The algorithm is tested accurately and reliably by using fingerprint images from different databases. In this paper the fingerprint databases used are FVC2000 and FVC2002 Databases, we see that, the FVC2002 database perform better results compare with FVC2000 database. The recognition system evaluate with two factor FAR and FRR, In this system the result of FAR is 0.0154 and FRR is 0.0137 with Accuracy equal to 98.55%.

Crime scene investigation (CSI) images are important clues for the police to solve cases. With the available of large scale CSI image database, effective and efficient CSI image retrieval becomes more and more important. The main contribution of this paper includes: (1) a DCT domain texture feature extraction algorithm is constructed for effective description of CSI images; (2) GIST descriptor is first exploited in the description of CSI images and integrated with color histogram and the DCT domain texture feature as a fused feature, which describes CSI images from different view including color, texture, and scene structure; (3) SVM Classification technique is used in CSI image retrieval. Experimental results on real CSI image data show that the fusion feature proposed in this paper can well describe the content of CSI images, with an average 15.3% increment in retrieval precision compared with all the single-feature-based algorithm. Using this fusion feature to further train the SVM classifier in the retrieval process, the precision is further improved by 3.1%.

3. PROPOSED WORK

The fingerprint images are subjected to image pre-processing, image feature extraction and identification analysis. Here we use image preprocessing techniques to improve image quality with the aim of enhancing local level features called minutiae. After minutiae extraction the fingerprint data will proceed to training using CNN network. An investigator takes the fingerprints at the crime scene and compares it with database of old criminals. After the image pre-processing techniques, the CNN system features to the fingerprint images and gives the accuracy of identification.

4. RESULTS AND DISCUSSIONS

Application using python and the Server process is maintained using the SOCKET & SERVERSOCKET and the Design part is played by Cascading Style Sheet(Figure 1 & Figure 2).

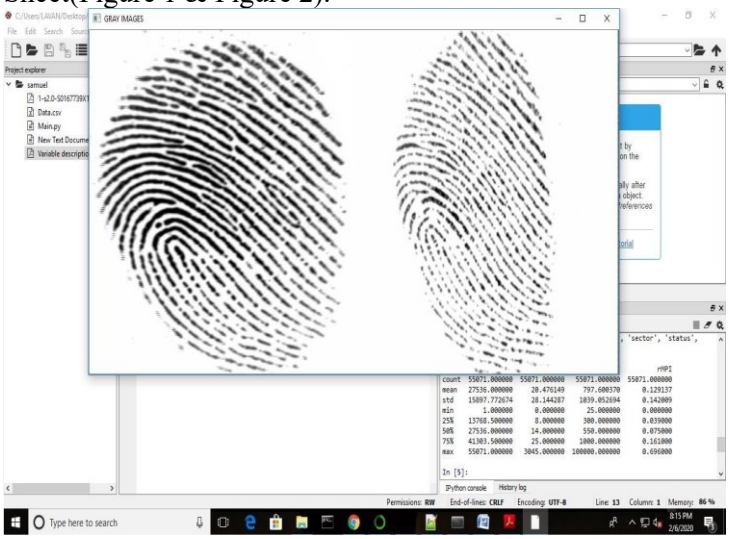

Figure 1.

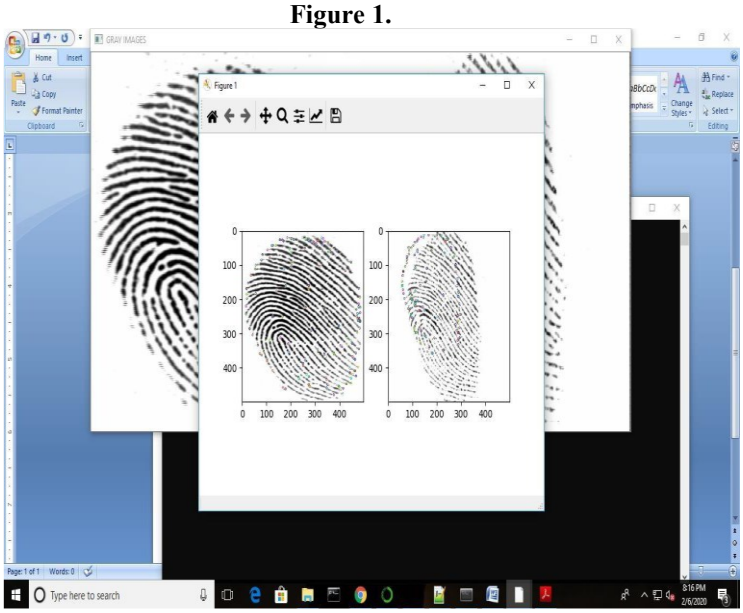

Figure 2.

Fingerprint identification system used for identifies the criminal who involved in the crime helps to automate fingerprint identification process. Pre-processing was performed with Otsu thresholding, fingerprint thinning and minutiae extraction with Cross-Number method. Feature extraction will be done by the CNN classifier. The performance of SVM and CNN based classifiers are analyzed. It is observed CNN gives better performance

compared to SVM because of its deep learning ability to learn relevant features from the image.

5. CONCLUSION

A recurrent neural network (RNN) is a class of artificial neural networks where connections between nodes form a directed graph along a temporal sequence. This allows it to exhibit temporal dynamic behavior. Unlike feedforward neural networks, RNNs can use their internal state (memory) to process sequences of inputs. This makes them applicable to tasks such as unsegmented, connected handwriting recognition or speech recognition.

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AGENT-BASED APPROACHES FOR INTELLIGENT INTER CLOUD RESOURCE ALLOCATION

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ABSTRACT Whereas an Intercloud is an interconnected global "cloud of clouds" that enables each cloud to tap into resources of other clouds, interactions among Intercloud stakeholders are complex because Intercloud resources are distributed and controlled by different clouds. "Agent-based cloud computing" involves the construction of agents for bolstering discovery, matching, selection, composition, negotiation, scheduling, workflow, and monitoring of Intercloud resources. An agent is a computer system that is capable of making decisions independently and interacting with other agents through cooperation, coordination, and negotiation. Using an agent- based approach, characteristics associated with intelligent behaviors of agents such as interacting socially through cooperation, coordination, and negotiation can be built into clouds. This paper 1) discusses the significance and advantages of using an agent paradigm for Intercloud resource allocation, 2) reviews representative models of agent-based Intercloud resource allocation and provides a comparison among these models, 3) compares agent-based and non-agent-based approaches for task executions in multiple clouds, and 4) provides pointers to future directions.

Keywords: Agent-based cloud computing and agent-based Intercloud resource allocation.

1. INTRODUCTION

Cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources. One of the essential aspects of cloud computing is creating the illusion that "infinite" computing resources are available on demand. However, the resources held by a single cloud are usually limited and it may not be able to deal with a sudden surge in user demands. An Intercloud is an interconnected global "cloud of clouds" that enables cooperation among clouds. In an Intercloud, each cloud can tap into resources of other clouds when it does not have sufficient resources to satisfy consumers' requests. Interclouds are classified into *federated clouds* and *multi-clouds*. In a federated cloud, providers voluntarily interconnect their infrastructures to enable sharing and exchange of resources among themselves. Federated clouds are classified into *centralized* (resource allocation performed by a central entity) and *peer-to-peer* (no central authority) modes [4]. Clouds interconnected at the *same* layer (e.g., between two or more *IaaS*providers) is called a *horizontal federation* and clouds interconnected at *different* layers (e.g., between a *PaaS*provider and an *IaaS*provider) is called a *vertical federation* [6] (see Appendix A in supplemental material). In a multi-cloud, cloud providers do not necessarily volunteer to interconnect and share their infrastructures, and consumers are responsible for managing resources across multiple clouds.Even though a wide range of issues is involved when constructing an Intercloud, e.g., connectivity , interoperability, security, communication and others, this survey only focuses on reviewing and comparing agent-based approaches that specifically address the Intercloud resource allocation problem. Works addressing issues other than Intercloud resource allocation (e.g., interoperability and security) are outside the scope of this survey.

2. LITERATURE REVIEW

Cloud computing isa term applied tolarge, hosted data enters, usually geographically
distributed, which offer various computational services on aldquoutilityrdquo basis. Most
typically theconfiguration and provisioning ofthesedataenters, asfarasthe servicesforthesubscribers go, is highly automated, to the point of the service being delivered within seconds of the subscriber request. Additionally, the data enters typically use hypervisor based virtualization as a technique to deliver these services. The concept of a cloud operated by one service provider or enterprise interoperating with a clouds operated by another is a powerful idea. So far that is limited to use cases where code running on one cloud

explicitly references a service on another cloud. There is no implicit and transparent interoperability. Use cases for interoperability, as well as work-in-progress around inter-cloud protocols and formats for enabling those use cases, are discussed in this paper.

Although Cloud computing itself has many open problems, researchers in the field have already made the leap to envision Inter-Cloud computing. Their goal is to achieve better overall Quality of Service (QoS), reliability and cost efficiency by utilizing multiple clouds. Inter-Cloud research is still in its infancy, and the body of knowledge in the area has not been well defined yet. In this work, we propose and motivate taxonomies for Inter-Cloud architectures and application brokering mechanisms. We present a detailed survey of the state of the art in terms of both academic and industry developments (20 projects), and we fit each project onto the discussed taxonomies. We discuss how the current Inter-Cloud environments facilitate brokering of distributed applications across clouds considering their nonfunctional requirements. Finally, we analyse the existing works and identify open challenges and trends in the area of Inter-Cloud application brokering.

The booming cloud computing industry offers a plethora of services. Navigation through these services is a long and perilous process. Cloud brokers can help in this journey, offering a more comprehensible view to the cloud service customers and service orchestration opportunities. From the service provider perspective, brokers facilitate reaching customers. In this invited article, the authors present a broad overview of cloud brokering. The article starts with a description of cloud brokers, the related taxonomy, their place in the business environment, and the legal framework. It briefly summarizes existing broker offers and cloud brokering research topics and discusses future challenges of cloud brokering.

In a business model for cloud computing, users pay providers for consumption of their computing capabilities. This work proposes an agent-based testbed for bolstering the discovery of cloud resources and SLA negotiation. In the testbed, provider and consumer agents act as intermediaries between providers and consumers. Through a 4-stage resource discovery process (selection, evaluation, filtering, and recommendation), a set of broker agents match consumers' requests to advertisements from providers. Following the matching of requests to resources, consumer and provider agents negotiate for mutually acceptable resource time slots. Empirical results show that broker agents are successful in matching requests to resources, and consumer and provider agents are successful in negotiating for mutually acceptable time slots.

3. PROPOSED WORK

In this paper we propose Interclouds which are classified into federated clouds andmulti-clouds . In a federated cloud , providers voluntarily interconnect theirinfrastructures to enable sharing and exchange of resources among themselves.In a multi-cloud, cloud providers do not necessarily volunteer to interconnect andshare their infrastructures, and consumers are responsible for managing resourcesacross multiple clouds.

4. RESULT ANALYSIS AND DISCUSSIONS

In Figure 1 web application using COREJAVA and the Server process is maintained using the SOCKET & SERVERSOCKET and the Design part is played by Cascading Style Sheet.

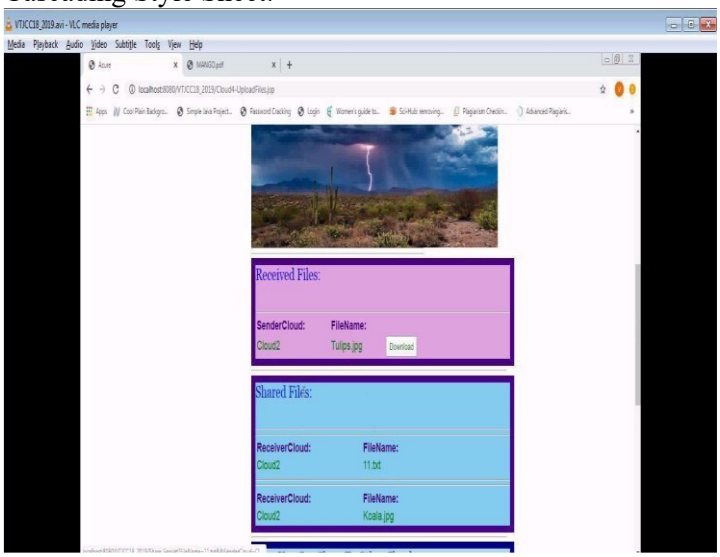

Figure 1

In this paper, an exposition of agent-based problem-solving approaches for intelligent Intercloud resource allocation is provided. The contributions of this paper are manifold. Agent-based cloud computing and cloud intelligence. It describes the motivation, advantages, and significance of adopting an agent paradigm for intelligent Intercloud resource allocation.

It provides a comprehensive overview of the state-of-the-art research on adopting an agent-based paradigm for Intercloud resource allocation by reviewing representative agent-based Intercloud resource allocation models.

It provides a comparison and critique of the state-of-the-art agent-based Intercloud resource allocation models. Summarizing and comparing the features of existing agent-based Intercloud resource

allocation models provide designers with pointers to and guidelines on some of the essential design considerations for developing new agent-based techniques for Intercloud resource allocation.

It provides a comparison between agent-based and non-agent-based approaches for cloud BoT execution. In particular, section 4 identifies and discusses the advantages of adopting an agent paradigm for Intercloud resource allocation.

It provides pointers to future directions. Whereas the IEEE Cloud Computing Initiative aims to create the IEEE Intercloudtested to tie all clouds togetherand the IEEE P2302 standard for specifying Intercloud interoperability, it is anticipated that ABCC will play a significant role in another important aspect ─ shaping the "intelligent Intercloud" vision [14]. An intelligent Intercloud is an interconnected "cloud of clouds" populated by a society of agents that automate interactions among stakeholders (consumers, brokers, and providers) in a wide range of resource allocation activities.

5. CONCLUSION

In this research paper worked on just user reviews. In future, user behaviors can be combined with texts to construct a better model for classification. Advanced preprocessing tools for tokenization can be used to make the dataset more precise. Evaluation of the effectiveness of the proposed methodology can be done for a larger data set. This research work is being done only for English reviews. It can be done for Bangla and several other languages.

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DESIGN OF SECURE AUTHENTICATED KEY MANAGEMENT PROTOCOL FOR CLOUD COMPUTING ENVIRONMENTS

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ABSTRACT :- With the development of distributed computing innovation as far as dependability and productivity, countless administrations have relocated to the cloud stage. To advantageous access to the administrations and ensure the security of correspondence in the general population arrange, three-factor Mutual Authentication and Key Agreement (MAKA) conventions for multi-server models increase wide consideration. Be that as it may, a large portion of the current three-factor MAKA conventions don't give a proper security evidence bringing about different assaults on the related conventions, or they have high calculation and correspondence costs. Furthermore, a large portion of the three-factor MAKA conventions haven't a unique disavowal component, which prompts malignant clients can not be speedily repudiated. To address these disadvantages, we propose a provable powerful revocable three-factor MAKA convention that accomplishes the client dynamic administration utilizing Schnorr marks and gives a proper security verification in the arbitrary prophet. Security investigation shows that our convention can satisfy different needs in the multi-server situations. Execution examination shows that the proposed plan is appropriate for figuring asset compelled savvy gadgets. The full form of the reproduction usage demonstrates the achievability of the convention.
Keywords :Mutual Authentication and Key Agreement

1. INTRODUCTION

In the ongoing decade, distributed computing innovation has been totally popularized. It can improve administration productivity as well as decrease costs. An ever increasing number of organizations are putting their administrations on the cloud stage for improvement, the board and upkeep. This not just decreases the neighborhood support trouble for these ventures, yet in addition gives bound together security and activity the board for all administrations on the outsider cloud stage, as appeared. Albeit outsider cloud stages have all the more dominant innovations and increasingly standard specialized determinations to guarantee that the servers run in a generally secure condition, clients and servers convey in people in general system. Subsequently, verification and key understanding are basic for the correspondence security. The utilization of shared confirmation and key understanding (MAKA) conventions keep aggressors from manhandling server assets, yet in addition avert malignant assailants acting like the server to get the client's data.

Along these lines, the MAKA conventions have been widely contemplated since Lamport proposed a secret phrase based validation convention. Prior MAKA conventions are intended for single-server design. As Internet clients develop exponentially, the quantity of cloud servers rendering various administrations has likewise developed altogether. For the single-server design, it is hard for clients to keep up an assortment of passwords for every server. To improve client experience, numerous researchers propose progressively adaptable MAKA conventions for multi-server conditions. Joined with the bound together administration highlights of the cloud stage, such conventions can be helpfully applied. The conventions for multi-server designs model clients and cloud servers just need to enlist in the enrollment focus (RC) to common verification and key understanding. In the multi-server conditions, the MAKA conventions can be additionally partitioned into two classes, two-factor MAKA conventions, to be specific personality, secret key, and three-factor MAKA conventions, in particular character, secret phrase, biometrics. The works have indicated that the secret word based MAKA conventions experience the ill effects of a few assaults, for example, speculating secret phrase assault.The target of this undertaking is to improve client experience, numerous researchers propose progressively adaptable MAKA

conventions for multi-server situations. Joined with the bound together administration highlights of the cloud stage, such conventions can be helpfully applied. The conventions for multi-server structures model.Users and cloud servers just need to enroll in the enlistment focus (RC) to common confirmation and key understanding.

2. LITERATURE REVIEW

Passive Internet of Things (IoT) like radio frequency identification (RFID) tags can be used to offer a wide range of services, such as object tracking or classification, marking ownership, noting boundaries, and indicating identities. While the communication link between a reader of the tag and the authentication server is generally assumed to be secure, the communication link between the reader and participating tags is mostly vulnerable to malicious acts. Many authentication protocols have been proposed in literature, however, they either are vulnerable to certain types of attacks or require prohibitively a large amount of computational resources to be implemented on a passive tag. In this paper, we present variants of a novel authentication protocol that can overcome the security flaws of previous protocols while being well suited to the computational capability of the tags. At the core of the proposed approach is our recently demonstrated self-powered timing devices that can be used for robust time-keeping and synchronization without the need for any external powering. The outputs of the timers are processed using a single hash function on the tag to produce tokens that continuously change with time, while being synchronized to tokens generated by the authentication server. The proposed protocol also incorporates margins of tolerance that make the authentication process robust to any deviations in the timer responses due to fabrication artifacts.

In large-scale systems, user authentication usually needs the assistance from a remote central authentication server via networks. The authentication service however could be slow or unavailable due to natural disasters or various cyber attacks on communication channels. This has raised serious concerns in systems which need robust authentication in emergency situations. The contribution of this paper is two-fold. In a slow connection situation, we present a secure generic multi-factor authentication protocol to speed up the whole authentication process. Compared with another generic protocol in the literature, the new proposal provides the same function with significant improvements in computation and communication. Another authentication mechanism, which we name stand-alone authentication, can authenticate users when the connection to the central server is down. We investigate several issues in stand-alone authentication and show how to add it on multi-factor authentication protocols in an efficient and generic way.

Information systems are vulnerable to many kinds of cyber attacks, one of which is unauthorized access. As an indispensable component for building secure information systems, authentication can prevent devices and services from unauthorized access by validating user identity. Authentication is an interactive process between a user and an authentication server. A simple but representative run of authentication is as follows: (1) The user first sends out an authentication request; (2) The authentication server responds with a challenge; and (3) The user proves his/her identity by calculating a response which is validated by the server. Complicated designs of authentication involve multi-round message exchanges to satisfy specific security requirements.

Rapid advances in wireless communication technologies have paved the way for a wide range of mobile devices to become increasingly ubiquitous and popular. Mobile devices enable anytime, anywhere access to the Internet. The fast growth of many types of mobile services used by various users has made the traditional single-server architecture inefficient in terms of its functional requirements. To ensure the availability of various mobile services, there is a need to deploy multi-server architectures. To ensure the security of various mobile service applications, the anonymous mobile user authentication (AMUA) protocol without online registration using the self-certified public key cryptography (SCPKC) for multi-server architectures was proposed in the past. However, most of the past AMUA solutions suffer from malicious attacks or have unacceptable computation and communication costs. To address these drawbacks, we propose a new AMUA protocol that uses the SCPKC for multi-server architectures. In contrast to the existing AMUA protocols, our proposed AMUA protocol incurs lower computation and communication costs. By comparing with two of the latest AMUA protocols, the computation and the communication costs of our protocol are at least 74.93% and 37.43% lower than them, respectively. Moreover, the security analysis of our AMUA protocol demonstrates that it satisfies the security requirements in practical applications and is provably secure in the novel security model.

The significant improvements in software, hardware, and wireless communication technologies have led to the emergence of a wide range of mobile devices such as PDAs, smart phones, and notebooks. These devices have become an integral part of our daily life today.. Wireless

communication technologies along with powerful mobile devices have led to the emergence and proliferation of many different types of mobile services such as mobile banking, mobile online shopping, mobile online game, and mobile pay-TV which can be accessed from anywhere at anytime. This technological revolution in mobile computing and devices brings a lot of convenience to end-users.

With the widespread promotion in e-commerce, the number of service servers providing Internet applications to the users is usually more than one and hence secure authentication protocols for multi-server environment are required. On the other hand, people may obtain their service by using the mobile devices in ubiquitous computing environment. Considering the mobile devices with limited energy resources and computing capability, the design of the secure authentication scheme suitable for mobile clients is a nontrivial challenge.They claimed that their scheme can be well applied to the remote user authentication scheme for multi-server environment.In this paper, we will show that Tseng et al.'s scheme cannot withstand an insider attack, offline dictionary attack and malicious server attack. The proposed scheme first provides a more secure key distribution based on self-certified public keys (SCPKs) among the service servers. The proposed scheme can achieve mutual authentication and session key agreement. To withstand an offline dictionary attack due to mobile devices security breach, the proposed scheme enhances the password change phase with the help of the registration server. Security analysis shows that our scheme can withstand various possible attacks resulting from the multi-server environment. Performance analysis and function comparisons demonstrate that the proposed scheme is well suited for mobile clients.

3. PROPOSED WORK

This paperpropose a provable dynamic revocable three-factor MAKA protocol that achieves the user dynamic management. In this protocol, users can be dynamically revoked to promptly prevent attacks from malicious users. The proposed protocol can be divided into eight phases: Initialization Phase, Server Registration Phase, Users Registration Phase, Time Key Update Phase, Login and Mutual Authentication Phase, Password and Biometrics Change Phase, New Server Update Phase and Dynamic Revocation Phase.

4. RESULT ANALYSIS AND DISCUSSIONS

This paper implements like web application using COREJAVA and the Server process is maintained using the SOCKET & SERVERSOCKET and the Design part is played by Cascading Style Sheet.

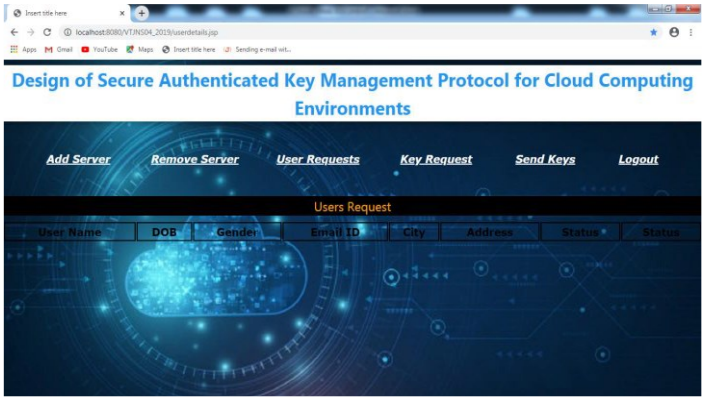

Figure 1. UserRequest.jsp

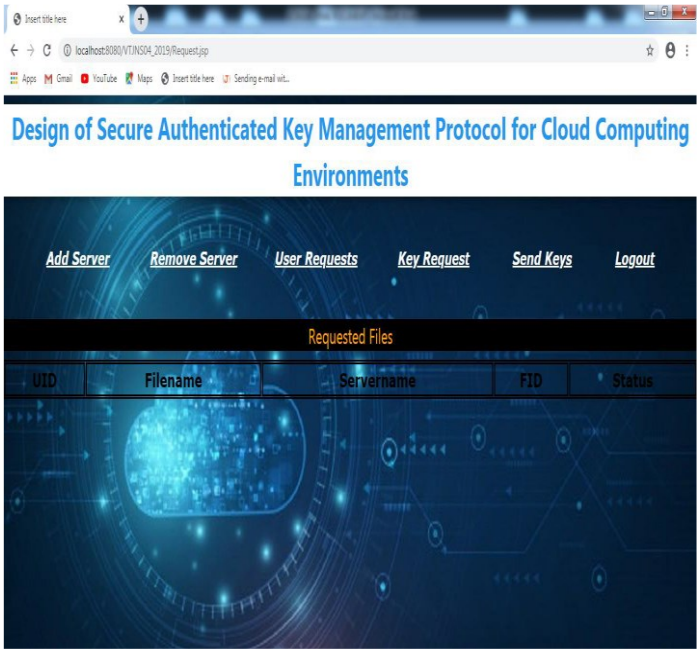

Figure 2. KeyRequest.jsp

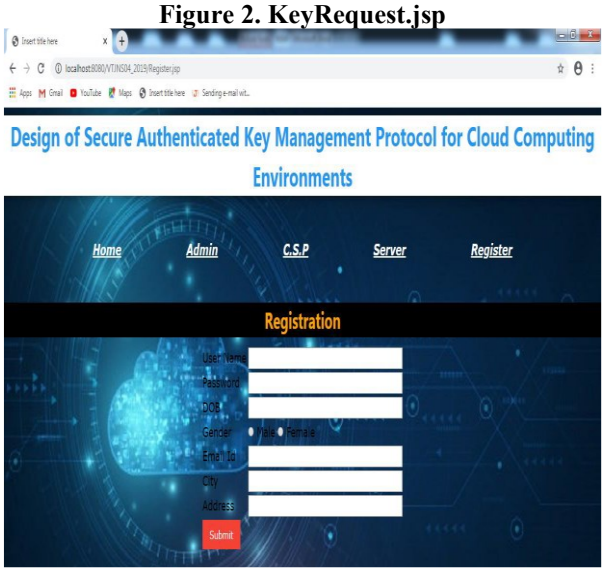

Figure 3. Register.jsp

5. CONCLUSION

To oppose the depletion of secret word assault on the two-factor MAKA conventions, an enormous number of three-factor MAKA conventions have been proposed. Be that as it may, practically all three factor MAKA conventions don't give formal evidences and dynamic client the executives instrument. So as to accomplish progressively adaptable client the board and higher security, this paper proposes another three-factor MAKA convention that supports dynamic repudiation and gives formal confirmation. The security shows that our convention accomplishes the security properties of necessities from multi-server conditions. Then again, through the thorough examination of execution, our convention doesn't forfeit productivity while improving the capacity. Actually, the proposed convention has extraordinary favorable circumstances as far as the complete calculation time.

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BLOCKCHAIN BASED PUBLIC INTEGRITY VERIFICATION FOR CLOUD STORAGE AGAINST PROCRASTINATING AUDITORS

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Abstract :-The deployment of cloud storage services has significant benefits in managing data forusers. However, it also causes many security concerns, and one of them is data integrity. Publicverificationtechniquescanenableauser toemployathird-partyauditortoverifythedataintegrityonbehalfofher/him,whereasexistingpublicverificationschemesarevulnerabletoprocrastinating auditors who may not perform verifications on time. Furthermore, most of publicverification schemes are constructed on the public key infrastructure (PKI), and thereby sufferfrom certificate management problem. In this paper, we propose the first certificateless publicverification scheme against procrastinating auditors (CPVPA) by using blockchain technology.The key idea is to require auditors to record each verification resultinto a blockchain as atransaction. Since transactions on the blockchain are time-sensitive, the verification can be time-stamped after the corresponding transaction is recorded into the blockchain, which enables usersto check whether auditors perform the verifications at the prescribed time. Moreover, CPVPA isbuilt on certificate less cryptography, and is free from the certificate management problem. Wepresentrigoroussecurityproofstodemonstratethesecurityofthe CPVPA,andconductacomprehensive performance evaluationtoshowthatCPVPAisefficient.

1. INTRODUCTION:-

The deployment of cloud storage services has significant benefits in managing data for users.However,it also causesmany security concerns,andone of themis dataintegrity.Publicverificationtechniquescanenableauser toemployathird-partyauditortoverifythedataintegrityonbehalfofher/him,whereasexistingpublicverificationschemesarevulnerabletoprocrastinating auditors who may not perform verifications on time. Furthermore, most of publicverification schemes are constructed on the public key infrastructure (PKI), and thereby sufferfrom certificate management problem. In this paper, we propose the first certificate less publicverification scheme against procrastinating auditors (CPVPA) by using blockchain technology.The key idea is to require auditors to record each verification result into a block chain as atransaction. Since transactions on the blockchain are time-sensitive, the verification can be time-stamped after the corresponding transaction is recorded into the block chain, which enables usersto check whether auditors perform the verifications at the prescribed time. Moreover, CPVPA isbuilt on certificate less cryptography, and is free from the certificate management problem. Wepresentrigoroussecurityproofstodemonstratethesecurityofthe CPVPA,andconductacomprehensive performance evaluationtoshowthatCPVPAisefficient.

2. EXISTING SYSTEM

In this paper, we have an existing system is the first certificateless public verification schemeagainstprocrastinatingauditors(CPVPA) byusingblockchaintechnology.CPVPAisbuiltonthecertificate less cryptography and avoids the certificate management problem. CPVPA, resistsmalicious auditors and procrastinating ones without introducing any trusted entity, where eachverification performed by the auditor is time-stamped by integrating it into a transaction of blockchain. The key idea is to require auditors to record each verification result into a blockchain as atransaction Since transactions on the blockchain are time-sensitive, the verification can be time-stamped after the corresponding transaction is recorded into the blockchain, which enables userstocheckwhetherauditors performthe verifications atthe prescribedtime.

Existing System Disadvantages:-

- Foreverytransactioninformationwillstoreinblock. Eachblockconnecttoanotherblocktheprocessofconnecting

eachblockisknownasblockchainsystem.Foreverytransaction more time/energyisrequired.

- Whilecomparewithprivateblockchainsystem,Publicblockchainisless secured.

3. LITERATURE SURVEY:-

1.Title:Privacy-preservingDataAggregationComputinginCyber-PhysicalSocialSystems
Author: JiahuiYu,KunWang.
Year: 2018
Description:
In cyber-physical social systems (CPSS), a group of volunteers report data about the physicalenvironment through their cyber devices and data aggregation is widely utilized. An importantissueindataaggregationforCPSSistoprotect users'privacy.Inthisarticle,weusebitwiseXORand propose a bit-choosing algorithm to realize privacy-preserving min, k-th min, and percentilecomputation.Byouralgorithm,theaggregatorcan confirmwhetherauser'sdatavalueisequaltocertain value or within certain scale. Consequently, it is also possible to count the number of users satisfying given conditions. Our bit-choosing algorithm makes sure that the users send non-repetitionrepliestotheaggregatortoraisetheaggregationaccuracy.Weanalyzethecommunication cost and the achievable accuracy of our algorithm. Via performance comparisonagainstexistingprotocols,theefficiencyandaccuracy ofouralgorithmareverified.

2.Title:QueryinginInternetofThingswithPrivacyPreserving:Challenges,SolutionsandOpportunities
Author:Hao Ren,HongweiLi,and YuanshunDai
Year: 2018
Description:
IoTisenvisionedasthenextstageoftheinformationrevolution,enablingvariousdailyapplicationsandprovidingbetterservicebyconductingadeepfusion with cloudandfogcomputing.As thekeymission ofmost IoTapplications,datamanagement,especiallythefundamental function-dataquery,haslongbeenplaguedbyseveresecurityandprivacyproblems.Mostqueryserviceproviders,includingthebigones(e.g.,Google,Facebook,Amazon, andsoon)aresufferingfromintensiveattackslaunchedbyinsidersoroutsiders.Asaconsequence,processing various queries in IoT without compromising the data and query privacy is an urgentand challenging issue. In this article, we propose a thing-fog-cloud architecture for secure queryprocessing based on well studied classical paradigms. Following with a description of crucialtechnical challenges in terms of functionality, privacy and efficiency assurance, we survey thelatestmilestone-likeapproaches,andprovideaninsightintotheadvantagesandlimitationsofeachscheme. Based on the recent advances, we also discuss future research opportunities to motivateefforts to develop practical private query protocols in IoT.This article presents a case study andprovidesdetailaboutchallengesand approachesindataextraction,modeling,andvisualization.

3.Title:Efficientandsecureoutsourcingofdifferentiallyprivatedatapublication
Author:JinLi, HengYe,WeiWang
Year: 2018
Description:
While big data becomes a main impetus to the next generation of IT industry, big data privacy, asan unevadable topic in big data era, has received considerable attention in recent years. To dealwith the privacy challenges, differential privacy has been widely discussed as one of the mostpopularprivacy-enhancingtechniques.However,withtoday'sdifferentialprivacytechniques,itisimpossibletogenerateasanitizeddataset that cansuit differentalgorithmsor applicationsregardless of the privacy budget. In other words, in order to adapt to various applications andprivacybudgets,differentkindsofnoiseshaveto beadded,whichinevitablyincurenormouscostsforbothcommunicationandstorage.Toaddresstheabovechallenges,inthispaper,weproposeanovelschemeforoutsourcingdifferentialprivacyincloudcomputing,whereanadditivehomomorphic encryption (e.g., Paillier encryption) is employed to compute noise for differentialprivacy by cloud servers to boost efficiency. The proposed scheme allows data providers tooutsourcetheirdatasetsanitizationproceduretocloudserviceproviderswithalowcommunicationcost. In addition, the data providers can gooffline after uploading their datasets andnoiseparameters, which is one of the critical requirements for a practical system. We present a detailedtheoretical analysis of our proposed scheme, including proofs of differential privacy and security.Moreover, we also report an experimental evaluation on real UCI datasets, which confirms theeffectivenessoftheproposedscheme.

4.Title:Asecureversatile lightpaymentsystembasedonblockchain
Author:LinZhong,Qianhong Wu,Bo Qin.
Year: 2019
Description:

Ever-increasing transaction costs, serious network congestion, and low transaction rates in thecurrentblockchainsystemsrestricttheirextensiveuse.To relievefromthissituation,wepresenta secure versatile light payment (SVLP) scheme. The SVLP merely employs a digital signaturealgorithm and a one-way function and has similar security comparing to existing blockchainsystems, such as Bitcoin and Ethereum. The proposed scheme is of ultra-low power consumption, sincethepayersandpayeesonlyneedone-wayfunctionstoachievemultipletransactions,insteadof the costly digital signature algorithms. Furthermore, the processes of payment and refundingare flexible. This is due to the fact that the denomination in our scheme possesses divisibility andtheusersneednottoverifythepreimagesonthelongchain one-by-one.Finally,asthetransactioncanbetakenoff-chainandoffline,itcanbeevenusedinremoteareasor geologicaldisastersareaswhere communication infrastructures are lacked or destroyed. All these features indicate that ourschemeispracticalandversatile.

5.Title:Privacy-preservingattribute-keywordbaseddatapublish-subscribeserviceoncloudplatforms

Author:kanyang,kuanzhang.

Year: 2017

Description:

Datapublish-subscribeserviceisaneffectiveapproachtoselectivelyshare andselectivelyreceivedata.Towardsthehugeamountofdata generatedinourdailylife,cloudsystems,witheconomicalbut powerful storage and computing resources, are inevitably becoming the most appropriateplatformfor datapublicationandsubscription.However,cloudserverma yalsocuriousaboutboththe published data and the interests of the subscribers. In this paper, we propose a privacy-preservingAttribute-KeywordbaseddataPublish-Subscribe(AKPS)schemeforcloudplatforms.Specifically,i nordertoprotecttheprivacyofthepublisheddataagainstthecl oudserverandother none-subscribers,weemploytheattribute-basedencryptionwithdecryptionoutsourcingtoencrypt the published data, such that the publishers can control the data access by themselves andthe major decryption overhead can be shift from the subscribers' devices to the cloud server. Toprotectthesubscribers'interests,weproposeanewsearcha bleencryptiontoenablethesubscriberstoselectively receive interested data. Different from existing symmetric searchable encryptionmethods, the AKPS can support multiple publishers and multiple subscribers, while none of twopublishers/subscribers share the same secret keys. Moreover, the publishers cannot act as thesubscribers,andviceversa.Toavoidbypassingaccess/su bscriptionpolicycheckingprocedure,theAKPS smartly ties both access policy and subscription policy by two secrets. One secret is usedto bundle the ciphertextand the tags together, while the other secretis used tobundle thesubscription trapdoor and the pre-decryption key together. The security proof and performanceevaluation show that the proposed AKPS scheme is provable secure in random oracle model andefficientinpractice.

4. PROPOSEDSYSTEM

In this, we propose first certificateless public verification scheme against procrastinating auditors(CPVPA) by using private blockchain technology with less power consumption. CPVPA withprivate block chain system avoids the energy and time consumption. while compare with publicblockchain,privateblockchainisverysecured.Permis sionednetworksplacerestrictionsonwhois allowed to participate in the network and in what transactions. The Email idea is to requireauditors to record each verification result into a blockchain as a transaction. Private block chainalso work same as like a our Existing but in this we are having less power and time consumptionwith a secure block chain. In private block chain system we are storing transactions informationwithasecure.

Proposed SystemAdvantages

- Comparetopublicblockchainprivateblockisveryse cured.
- Foreverytransactionwearesendingalertmailtouser anditsdecreaingtime/energyconsumption.

5. IMPLEMENTATION

Theorganizationofdistributedstorageadministrationshash ugeadvantagesinoverseeinginformation for clients. Notwithstanding, it likewise causes numerous security concerns, and oneof them is information uprightness. Open check procedures can empower a client to utilize anoutsider evaluator to confirm the information respectability in the interest of her/him, whileexisting openconfirmationplansaredefenselessagainsttarryingexa minerswhomaynotperformconfirmations on schedule. Besides, the majority of open check plans are built on people in publickey infrastructure (PKI), and along these lines experience the ill effects of declaration the boardissue. In this paper, we propose the principal certificateless public verification scheme againstprocrastinatingauditors(CPVPA)byutilizingblockc haininnovation.Thekeythoughtistoexpectinspectors to

record every confirmation result into a blockchain as an exchange. Since exchangeson the blockchain are time-delicate, the confirmation canbe time-stepped after the relatingexchangeisrecordedintotheblockchain,whichemp owersclientstocheckwhetherreviewersplayoutthe confirmations atthe endorsed time.In addition,CPVPAis based on certificatelesscryptography,andisfreefromtheendorsemen ttheexecutivesissue.Wepresent thoroughsecurityverifications to exhibit the security of CPVPA, and direct an extensive presentation assessment toshow thatCPVPA is effective.

We will find how to build CPVPA by using other blockchain systems. Constructing CPVPA byusing other block chain systems (eg: proofs of stake based block chain systems, Delegated proofof stake(DPoS), Byzantine fault tolerance) which can provide less energy consumption. It'srequires an elaborated design to achieve the same security to ensure the high efficiency. We willalso investigate how to utilize blockchain technology to enhance cloud storage systems in termsofsecurity,performance andfunctionality.

6. MODULE DESCRIPTION

1. UserInterface
2. User
3. Blockchain
4. Cloud server
5. Auditor

1. UserInterfaceDesign

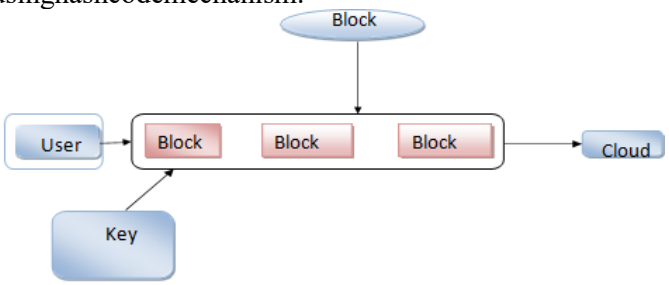
In this module we design the windows for the project. These windows are used for secure loginfor all users. To connect with server user must give their username and password then only theycan able to connect the server. If the user already exits directly can login into the server else usermustregistertheirdetailssuchasusername,passwordan d Emailid,into the server.

2.User

The user is the data owner, who outsources her/his data to the cloud server and accesses theoutsourceddataasneeded.Ifuserwantstostoreanyinform ation incloudfirstuser needtoregisterand login with a valid Email-Id and password. After data outsourcing, the user employs a TPA,agreesaverificationperiodwithTPA,andletTPAperio dicallyverifythedataintegrity.Foreveryverificationuser willgetmailnotificationsfromauditor forsecuritypurpose.Foreverytransactionkeygenerationpla ntwillgeneratekeyforauser.

3.Block Chain

Thisistheimportantmoduleinthisprojectbyusingthistechno logywearedividingthefiledescription intoblocksandconnectone byone usinghashcodemechanism.

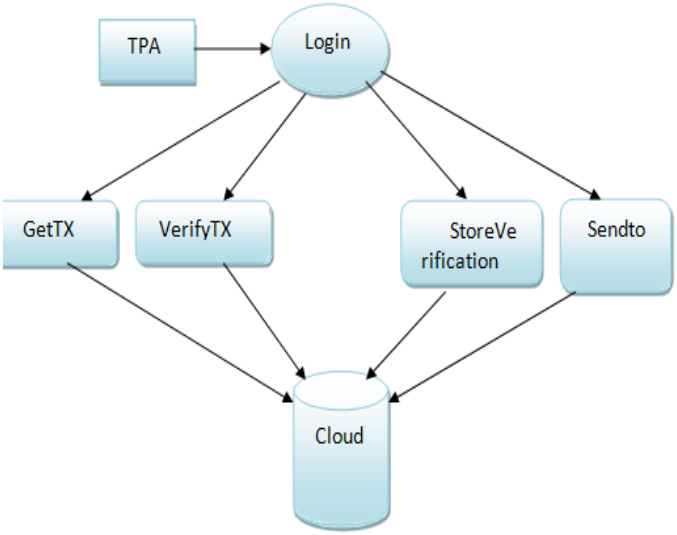


4.Cloud Server

Cloud will store the data of user. It will store all the transaction details of each and every useranditwillprovidesecurityforthosetransactionsanduser details.Andthetransactiondetailsgivento auditor for verification and after verication from the auditor it will store all the details of eachand everytransationwithverificationstatus.Andverificationstat usisprovided touser.

5.Third Party Auditor(TPA)

TPA works for the user. TPA receives the transaction details of users and verifies thosetransactions and forward the verification details to user. If TPA tries to get other user details thealertmessage senttothatparticularuserforsecurityreasons.



GIVENINPUTEXPECTEDOUTPUT:

➢ **UserInterfaceDesign**

Input :Toconnectwithserverusermustgivetheirusernam eandpassword.Output :Withvalidnameandpasswordtheycanabletoconne cttheserver.

➢ **User**

Input : If user wants to store any information in cloud first user need to register. After dataoutsourcing,the useremploys a TPA,agrees a verification period with TPA,andletTPAperiodicallyverifythedataintegrity.

Output:Withvalidnameandpasswordtheycanabletoconnectheserver.Foreveryverificationuser will get mail notifications from auditor for security purpose. For every transaction keygenerationplantwillgeneratekeyforauser.

➢ **Block Chain**

Input:Inblockchainsystem,wewillstoretransactioninformationfromThirdpartyauditor(TPA)intodifferentblocksinblockchainsystem.

Input:Itwillprovidemoresecurityforinformation.Itwillworksbasedonhashcode.

➢ **Cloud Server**

Input :Firstcloudneedtologin.

Itwillstoreallthetransactiondetailsofeachandeveryusser.Atransactiondetailsgiventoauditorforverification.

Output :Withvalidnameandpasswordonlycloudcanabletogethomepage. thetransactiondetailsgiventoauditorforverificationandafter verificationfromtheauditoritwillstoreallthedetailsofeachandeverytransactionwithverificationstatus.

Andverificationstatus isprovidedtouser.

Third PartyAuditor(TPA)

Input:TPAreceivesthe transactiondetailsofusers

Output: TPA receives the transaction details,verifies those transactions andforwards theverification details to user. If TPA tries to get other user details the alert message sent to thatparticularuserforsecurityreasons.

7. CONCLUSION:-

Inthispaper,wehaveproposedacertificatelesspublicverificationschemeagainsttheprocrastinating auditor, namely CPVPA.CPVPA utilizes the on-chain currencies, where eachverificationperformedbytheauditorisintegratedintoatransactionontheblockchainofon-chaincurrencies.

Furthermore, CPVPA is free from the certificate management problem. The securityanalysis demonstrates thatCPVPA provides the strongestsecurity guarantee compared withexistingschemes.Wehavealsoconductedacomprehensiveperformanceanalysis,whichdemonstrates that CPVPA has constant communication overhead and is efficient in terms ofcomputationoverhead.

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A HIERARCHICAL ATTENTION MODEL FOR SOCIAL CONTEXTUAL IMAGERECOMMENDATION

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ABSTRACT-Image based social networks are among the most popular social networking services in recent years. With tremendous images uploaded every day, understanding users' preferences on user-generated images and making recommendations have become an urgent need. In fact, many hybrid models have been proposed to fuse various kinds of side information (e.g., image visual representation, social network) and user-item historical behavior for enhancing recommendation performance. However, due to the unique characteristics of the user generated images in social image platforms, the previous studies failed to capture the complex aspects that influence users' preferences in a unified framework. Moreover, most of these hybrid models relied on predefined weights in combining different kinds of information, which usually resulted in suboptimal recommendation performance. To this end, in this paper, we develop a hierarchical attention model for social contextual image recommendation. In addition to basic latent user interest modeling in the popular matrix factorization based recommendation, we identify three key aspects (i.e., upload history, social influence, and owner admiration) that affect each user's latent preferences, where each aspect summarizes a contextual factor from the complex relationships between users and images. After that, we design a hierarchical attention network that naturally mirrors the hierarchical relationship (elements in each aspects level, and the aspect level) of users' latent interests with the identified key aspects. Specifically, by taking embeddings from state-of-the-art deep learning models that are tailored for each kind of data, the hierarchical attention network could learn to attend differently to more or less content. Finally, extensive experimental results on real-world datasets clearly show the superiority of our proposed model.

1. INTRODUCTION

There is an old saying "a picture is worth a thousand words". When it comes to social media, it turns out that visual images are growing much more popularity to attract users. Especially with the increasing adoption of smartphones, users could easily take qualified images and upload them to various social image platforms to share these visually appealing pictures with others. Many image-based social sharing services have emerged, such as Instagram1, Pinterest2, and Flickr3. With hundreds of millions of images uploaded every day, image recommendation has become an urgent need to deal with the image overload problem. By providing personalized image suggestions to each active user in image recommender system, users gain more satisfaction for platform prosperity. E.g., as reported by Pinterest, image recommendation powers over 40% of user engagement of this social platform.

Naturally, the standard recommendation algorithms provide a direct solution for the image recommendation task. For example, many classical latent factor based Collaborative Filtering (CF) algorithms in recommender systems could be applied to deal with user-image interaction matrix Successful as they are, the extreme data sparsity of the user-image interaction behaviourlimits the recommendation performance. On one hand, some recent works proposed to enhance recommendation performance with visual contents learned from a (pre-trained) deep neural network. On the other hand, as users perform image preferences in social platforms, some social based recommendation algorithms utilized the social influence among users to alleviate data sparsity for better recommendation . In summary, these studies partially solved the data sparsity issue of social-based image recommendation. Nevertheless, the problem of how to better exploit the unique characteristics of the social image platforms in a holistical way to enhance recommendation performance is still under explored.

2. LITERATURE SURVEY

1.TITLE: Toward the next generation of recommender systems: A survey of the state-ofthe-art and possible extensions.
AUTHOR: G. Adomavicius and A. Tuzhilin. YEAR: 2005
DESCRIPTION
This paper presents an overview of the field of recommender systems and describes the current generation of recommendation methods that are usually classified into the following three main categories: content-based, collaborative, and hybrid recommendation approaches. This paper also describes various limitations of current recommendation methods and discusses possible extensions that can improve recommendation capabilities and make recommender systems applicable to an even broader range of applications. These extensions include, among others, an improvement of understanding of users and items, incorporation of the contextual information into the recommendation process, support for multicriteria ratings, and a provision of more flexible and less intrusive types of recommendations.
2.TITLE: Influence and correlation in social networks
AUTHOR: A. Anagnostopoulos, R. Kumar, and M. Mahdian.
YEAR: 2008
DESCRIPTION
In many online social systems, social ties between users play an important role in dictating their behavior. One of the ways this can happen is through social influence, the phenomenon that the actions of a user can induce his/her friends to behave in a similar way. In systems where social influence exists, ideas, modes of behavior, or new technologies can diffuse through the network like an epidemic. Therefore, identifying and understanding social influence is of tremendous interest from both analysis and design points of view. This is a difficult task in general, since there are factors such as homophily or unobserved confounding variables that can induce statistical correlation between the actions of friends in a social network. Distinguishing influence from these is essentially the problem of distinguishing correlation from causality, a notoriously hard statistical problem. In this paper we study this problem systematically. We define fairly general models that replicate the aforementioned sources of social correlation. We then propose two simple tests that can identify influence as a source of social correlation when the time series of user actions is available. We give a theoretical justification of one of the tests by proving that with high probability it succeeds in ruling out influence in a rather general model of social correlation. We also simulate our tests on a number of examples designed by randomly generating actions of nodes on a real social network (from Flickr) according to one of several models. Simulation results confirm that our test performs well on these data. Finally, we apply them to real tagging data on Flickr, exhibiting that while there is significant social correlation in tagging behavior on this system, this correlation cannot be attributed to social influence.
3.TITLE: Neural machine translation by jointly learning to align and translate. AUTHOR: D. Bahdanau, K. Cho, and Y. Bengio
YEAR: 2015
DESCRIPTION
Neural machine translation is a recently proposed approach to machine translation. Unlike the traditional statistical machine translation, the neural machine translation aims at building a single neural network that can be jointly tuned to maximize the translation performance. The models proposed recently for neural machine translation often belong to a family of encoder-decoders and consists of an encoder that encodes a source sentence into a fixed-length vector from which a decoder generates a translation. In this paper, we conjecture that the use of a fixed-length vector is a bottleneck in improving the performance of this basic encoder-decoder architecture, and propose to extend this by allowing a model to automatically (soft-)search for parts of a source sentence that are relevant to predicting a target word, without having to form these parts as a hard segment explicitly. With this new approach, we achieve a translation performance comparable to the existing state-of-the-art phrase-based system on the task of English-to-French translation. Furthermore, qualitative analysis reveals that the (soft-)alignments found by the model agree well with our intuition.
4.TITLE: Attentive collaborative filtering: Multimedia recommendation with item and component-level attention
AUTHOR: J. Chen, H. Zhang, X. He, L. Nie, W. Liu, and T.-S. Chua
YEAR: 2017
DESCRIPTION
Multimedia content is dominating today's Web information. The nature of multimedia user-item interactions is 1/0 binary implicit feedback (e.g., photo likes, video views, song downloads, etc.), which can be collected at a larger scale with a much lower cost than explicit feedback (e.g., product ratings). However, the majority of existing collaborative filtering (CF) systems

are not well-designed for multimedia recommendation, since they ignore the implicitness in users' interactions with multimedia content. We argue that, in multimedia recommendation, there exists item- and component-level implicitness which blurs the underlying users' preferences. The item-level implicitness means that users' preferences on items (e.g. photos, videos, songs, etc.) are unknown, while the component-level implicitness means that inside each item users' preferences on different components (e.g. regions in an image, frames of a video, etc.) are unknown. For example, a 'view" on a video does not provide any specific information about how the user likes the video (i.e. item-level) and which parts of the video the user is interested in (i.e. component-level). In this paper, we introduce a novel attention mechanism in CF to address the challenging item- and component-level implicit feedback in multimedia recommendation, dubbed Attentive Collaborative Filtering (ACF). Specifically, our attention model is a neural network that consists of two attention modules: the component-level attention module, starting from any content feature extraction network (e.g. CNN for images/videos), which learns to select informative components of multimedia items, and the item-level attention module, which learns to score the item preferences. ACF can be seamlessly incorporated into classic CF models with implicit feedback, such as BPR and SVD++, and efficiently trained usingSGD. Through extensive experiments on two real-world multimedia Web services: Vine and Pinterest, we show that ACF significantly outperforms state-of-the-art CF methods.

5.TITLE: Context-aware image tweet modelling and recommendation

AUTHOR: T. Chen, X. He, and M.-Y. Kan YEAR: 2016

DESCRIPTION

While efforts have been made on bridging the semantic gap in image understanding, the in situ understanding of social media images is arguably more important but has had less progress. In this work, we enrich the representation of images in image tweets by considering their social context. We argue that in the microblog context, traditional image features, e.g., low-level SIFT or high-level detected objects, are far from adequate in interpreting the necessary semantics latent in image tweets. To bridge this gap, we move from the images' pixels to their context and propose a context-aware image bf tweet modelling (CITING) framework to mine and fuse contextual text to model such social media images' semantics. We start with tweet's intrinsic contexts, namely, 1) text within the image itself and 2) its accompanying text; and then we turn to the extrinsic contexts: 3) the external web page linked to by the tweet's embedded URL, and 4) the Web as a whole. These contexts can be leveraged to benefit many fundamental applications. To demonstrate the effectiveness our framework, we focus on the task of personalized image tweet recommendation, developing a feature-aware matrix factorization framework that encodes the contexts as a part of user interest modelling. Extensive experiments on a large Twitter dataset show that our proposed method significantly improves performance.

Finally, to spur future studies, we have released both the code of our recommendation model and our image tweet dataset.

6. TITLE: Nuswide: a real-world web image database from national university of Singapore

AUTHOR: L T.-S. Chua, J. Tang, R. Hong, H. Li, Z. Luo, and Y. Zheng.

YEAR: 2009

DESCRIPTION

This paper introduces a web image dataset created by NUS's Lab for Media Search. The dataset includes: (1) 269,648 images and the associated tags from Flickr, with a total of 5,018 unique tags; (2) six types of low-level features extracted from these images, including 64-D color histogram, 144-D color correlogram, 73-D edge direction histogram, 128-D wavelet texture, 225-D block-wise color moments extracted over 5x5 fixed grid partitions, and 500-D bag of words based on SIFT descriptions; and (3) ground-truth for 81 concepts that can be used for evaluation. Based on this dataset, we highlight characteristics of Web image collections and identify four research issues on web image annotation and retrieval. We also provide the baseline results for web image annotation by learning from the tags using the traditional k-NN algorithm. The benchmark results indicate that it is possible to learn effective models from sufficiently large image dataset to facilitate general image retrieval.

3. PROPOSED SYSTEM

In this paper, we develop a hierarchical attention model for social contextual image recommendation.

In addition to basic latent user interest modeling in the popular matrix factorization based recommendation, we identify three key aspects (i.e., upload history, social influence, and owner admiration) that affect each user's latent preferences, where each aspect summarizes a contextual factor from the complex relationships between users and images.

PROPOSED SYSTEM ADVANTAGES

1.Naturally mirrored the hierarchical relationship of users' interest.

2.Robust performance.

4. MODULE DESCRIPTION

In this paper, we study the problem of understanding users' preferences for images and recommending images in social image based platforms. An example of a typical social image application. Each image is associated with visual information. Besides showing likeness to images, users are also creators of these images with the upload behavior. In addition, users connect with others to form a social network to share their image preferences. The rich heterogeneous contextual data provides valuable clues to infer users' preferences to images. Given rich heterogeneous contextual data, the problem of how to summarize the heterogeneous social contextual aspects that influence users' preferences to these highly subjective content is still unclear. What's more, in the preference decision process, different users care about different social contextual aspects for their personalized image preference.

METHODOLOGIES

MODULES NAME:

This project having the following five modules:

1. User Interface Design 2. Admin 3. User 4. The learning algorithm of HASCUser Interface Design

In this module we design the windows for the project. These windows are used for secure login for all users. To connect with server user must give their username and password then only they can able to connect the server. If the user already exits directly can login into the server else user must register their details such as username, password and Email id, into the server. Server will create the account for the entire user to maintain upload and download rate. Name will be set as user id. Logging in is usually used to enter a specific page.

Admin

This is the second module in our project, where crucial functional requirements of the project will be carried out. The roles and responsibilities of the admin are listed below

Add Image Category: In this phase the admin can select different image types like 'Graphics', 'Photos', 'Vector' etc.

View Image Category: He can see all the categories he added.

Add Image Type: Basing on the category of the image selected admin will give name for which the users will upload the images basing on the Image category and type.

View Image type: Admin can view all the type of the images and their respective categories in this phase.

View Users: All the registered users in the project can be seen here.

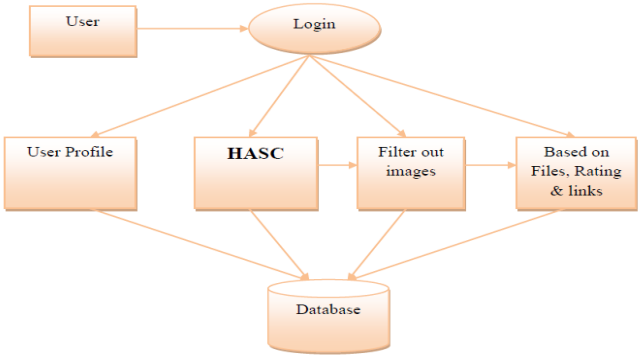
View User Requests: If any user want to register in to our website, First he should send a request to admin for which the acceptance mail will be sent by the admin to the user.

User

This is the third module in our project where our proposed algorithm will take effect basing on the data collected from the users. The functionality of the users in our project are listed below. In order to register in the site First user should send a request to admin for which the acceptance mail will be sent by the admin to the user, which consists of username and a secret key (For additional security). After the user had logged in he will be able to upload the images for the categories and image types which are given by the admin. For those images his/her friend scan give likes and rating. Basing on those data we will apply our algoritham and recommend images to the users (Upload History, Social Influence, Creator Admiration)

The learning algorithm of HASC

After data collection, in data pre-processing process, we filter out users that have less rating records and social links. We also filter out images that have less records. This leads to a smaller but denser dataset. Please note that the number of images is much more than that of the users. This is consistent with the observation that the number of images usually far exceeds that of users in social image platforms, as each user could be a creator to upload multiple images.



User Interface Design:

Input : Enter Login name and Password

Output : If valid user name and password then directly open the home page otherwise show error message and redirect to the registration page.

Admin:

Input : Admin Login name and Password

Output: If valid user name and password then directly open the admin home page otherwise show error message and redirect to the admin login page.

User:

Input : Enter all details Register & Login

Output : After the user had logged in he will be able to upload the images for the categories and image types which are given by the admin. For those images his/her friend scan give likes and rating.

The learning algorithm of HASC:-

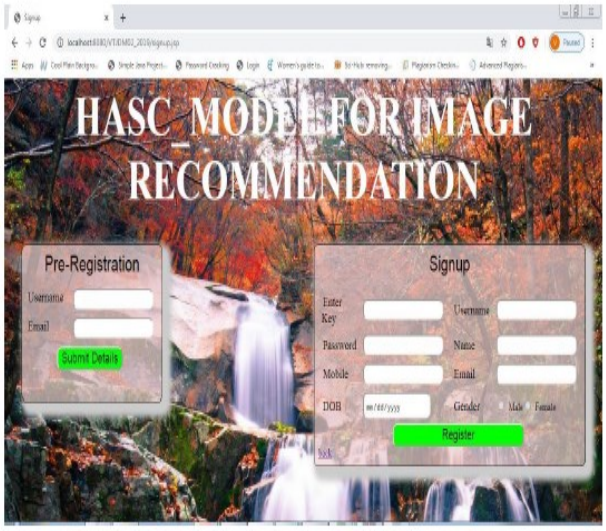
Input : Data pre-processing process

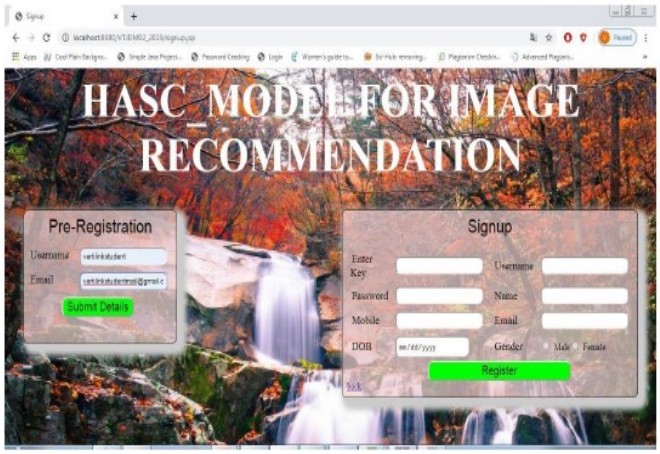
Output: This is consistent with the observation that the number of images usually far exceeds that of users in social image platforms, as each user could be a creator to upload multiple images**TECHNIQUE USED OR ALGORITHM USED**

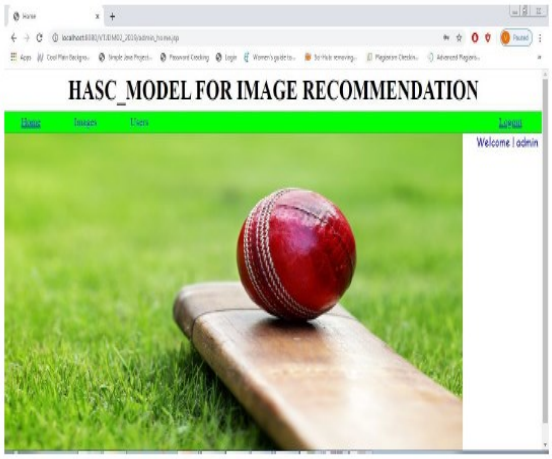
Hierarchical Attentive Social Contextual recommendation (HASC) model for image recommendation.

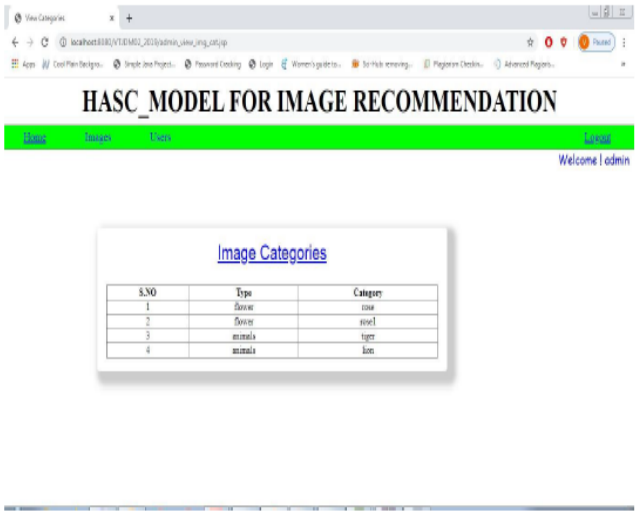
As shown in Fig. 3, HASC is a hierarchical neural network that models users' preferences for to unknown images from two attention levels with social contextual modeling. The top layered attention network depicts the importance of the three contextual aspects (i.e., upload history, social influence and creator admiration) for users' decision, which is derived from the bottom layered attention networks that aggregate the complex elements within each aspect. Given a user a and an image i with three identified social contextual aspects, we use al (l = 1; 2; 3) to denote a's attentive degree for aspect l on the top layer (denoted as the aspect importance attention with orange part in the figure). A large attentive degree denotes the current user cares more about this aspect in image recommendation process. Besides, as there are various elements within the pload history context la and social influence context sa. We use aj to denote a's preference degree for image j in the upload history context la (lja = 1), with a larger value of aj indicates that a's current interest is more coherent with uploaded image j by user a. Similarly, we use ab to denote the influence strength of the b to a in social neighbor context sa (sba = 1), with a larger value of ab indicates that a is more likely to be influenced by b. Please note that, for each user a and image i, different from the upload history aspect and the social influence aspect, the creator admiration aspect is composed of one element Ci (the creator). Thus, this aspect does not have any sub layers and it is directly sent to the top layer. We use three attention sub-networks to learn these attentive scores in a unified model.

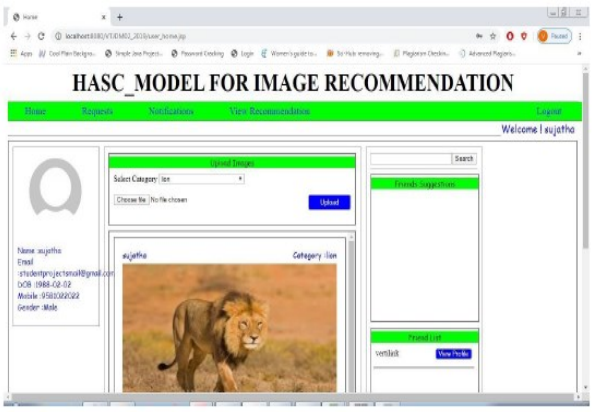
5. IMPLEMENTATION











6. CONCLUSION

In this paper, we have proposed a hierarchical attentive social contextual model of HASC for social contextual image recommendation. Specifically, in addition to user interest modeling, we have identified three social contextual aspects that influence a user's preference to an image from heterogeneous data: the upload history aspect, the social influence aspect, and the owner admiration aspect. We designed a hierarchical attention network that naturally mirrored the hierarchical relationship of users' interest given the three identified aspects. In the meantime, by feeding the data embedding from rich heterogeneous data sources, the hierarchical attention networks could learn to attend differently to more or less important content. Extensive experiments on real-world datasets clearly demonstrated that our proposed HASC model consistently outperforms various state-of-the-art baselines for image recommendation.

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PREDICTION AND DIAGNOSIS OF HEART DISEASE PATIENTS USING DATA MINING TECHNIQUE

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ABSTRACT- We are living in a post modern era and there are tremendous changes happening to our daily routines which make an impact on our health positively and negatively. As a result of these changes various kind of diseases are enormously increased. Especially, heart disease has become more common these days. The life of people is at a risk. Variation in Blood pressure, sugar, pulse rate etc. can lead to cardiovascular diseases that include narrowed or blocked blood vessels. It may causes Heart failure, Aneurysm, Peripheral artery disease, Heart attack, Stroke and even sudden cardiac arrest. Many forms of heart disease can be detected or diagnosed with different medical tests by considering family medical history and other factors. But, the prediction of heart diseases without doing any medical tests is quite difficult. The aim of this project is to diagnose different heart diseases and to make all possible precautions to prevent at early stage itself with affordable rate. We follow 'Data mining' technique in which attributes are fed in to SVM, Random forest, KNN, and ANN classification Algorithms for the prediction of heart diseases. The preliminary readings and studies obtained from this technique is used to know the possibility of detecting heart diseases at early stage and can be completely cured by proper diagnosis.

1. INTRODUCTION

There are so many diseases which affect us badly and one among them is Heart disease. It is a serious disease since we often hear that most of the people die out of Heart diseases and other kinds of similar diseases relates to heart[1-3] It is observed by most of the medical scholars that at many times most of the heart patients might not survive heart attacks and they die with it. In this paper we would like to deal with the four classification techniques which is use to prediction of heart disease[4-6]. Namely SVM, Random forest, KNN, ANN. The studies have been done by evaluating the medical profiles of people who undergoes treatment in JMMC (Jubilee Mission Medical College) Thrissur, by categorizing their age, sex, pulse rate, blood pressure as well as fasting blood sugar Etc. we chose those categories since it is observed that heart diseases are mainly studied likewise.

We hope there is always prime in studying about heart diseases. Our research we try to the possibility of detecting the heart diseases at early stage. It can completely cure the disease by proper diagnosis Heart Disease. Heart is the prime part in a human body. It is an operating system of our body. Other functions human body will badly affected the irregular function of heart Any disarray of the heart is Heart disease. Different from cardiovascular disease is the problems with the blood vessels and circulatory system as well as the heart. According to the cardiovascular disease is the leading cause of death in the UK, US, Canada, and Australia and will occur as a result of cardiovascular disease. Coronary heart disease, arrhythmia, and myocardial infarction are some examples of heart disease. Some important reasons of heart disease are age, smoking, diabetics, fatness, hereditary, depression, hyper tension, blood pressure, cholesterol etc. Usually cardio vascular disease can be use with surgery or medication. But its effective prevention is not yet being done. The effective prevention heart disease is also a target of the research.

2. EXISTING SYSTEM

- Many forms of heart disease can be detected or diagnosed with different medical tests by considering family medical history and other factors. But, the prediction of heart diseases without doing any medical tests is quite difficult.
- It can answer complex queries for diagnosing disease and thus assist healthcare practitioners to make intelligent clinical decisions which traditional decision support systems cannot. By providing effective treatments, it also helps to reduce treatment costs.
- To enhance visualization and ease of interpretation, it displays the results in tabular forms. The system uses various data mining techniques

• It might have happened so many times that you or someone yours need doctors help immediately, but they are not available due to some reason.

EXISTING SYSTEM DISADVANTAGES

• The system very well reduces its first drawback as the paper work is replaced by database and it can retrieve the values any time.
• Accuracy Issues: A computerized system alone does not ensure accuracy, and the warehouse data is only as good as the data entry that created it.
• The system is not fully automated, it needs data from user for full diagnosis.
• Can't get accurate result
• Untimely results are detected

3. LITERATURE SURVEY

1.TITLE : Heart disease diagnosis using data mining technique. AUTHOR : Babu, Sarath
YEAR : 2017
DESCRIPTION
Data mining is an advanced technology, which is the process of discovering actionable information from large set of data, which is used to analyze large volumes of data and extracts patterns that can be converted to useful knowledge. Medical data mining has a great potential for exploring the hidden patterns in the data sets of medical domain. These patterns can be utilized to do clinical diagnosis. These data need to be collected in a standardized form. From the medical profiles fourteen attributes are extracted such as age, sex, blood pressure and blood sugar etc. can predict the likelihood of patient getting heart disease. These attributes are fed in to K-means algorithms, MAFIA algorithm and Decision tree classification in heart disease prediction, applying the data mining technique to heart disease treatment; it can provide as reliable performance as that achieved in diagnosing heart disease. By this medical industries could offer better diagnosis and treatment of the patient to attain a good quality of services. The main advantages of this paper are: early detection of heart disease and its diagnosis correctly on time and providing treatment with affordable cost.

2.TITLE : Disease forecasting system using data mining methods AUTHOR : Banu, MA Nishara, and B. Gomathy.
YEAR : 2014
DESCRIPTION
The healthcare industry collects large amounts of healthcare information which cannot be mined to find unknown information for efficient evaluation. Discovery of buried patterns frequently goes unexploited. Heart disease is a term for defining a huge amount of healthcare conditions that are related to the heart. This medicinal condition defines the unpredicted health conditions that directly control all the parts of the heart. Different data mining techniques such as association rule mining, classification, clustering are used to predict the heart disease in health care industry. The heart disease database is pre-processed to make the mining process more efficient. The pre-processed data is clustered using clustering algorithms like K-means to cluster relevant data in database. Maximal Frequent Item set Algorithm (MAFIA) is used for mining maximal frequent patterns in heart disease database. The frequent patterns can be classified using C4.5 algorithm as training algorithm using the concept of information entropy. The results showed that the designed prediction system is capable of predicting the heart attack successfully.

3.TITLE : Diagnosis of heart disease patients using fuzzy classification technique AUTHOR : Krishnaiah, V.
YEAR : 2014
DESCRIPTION
Data mining technique in the history of medical data found with enormous investigations found that the prediction of heart disease is very important in medical science. In medical history it is observed that the unstructured data as heterogeneous data and it is observed that the data formed with different attributes should be analyzed to predict and provide information for making diagnosis of a heart patient. Various techniques in Data Mining have been applied to predict the heart disease patients. But, the uncertainty in data was not removed with the techniques available in data mining and implemented by various authors. To remove uncertainty of unstructured data, an attempt was made by introducing fuzziness in the measured data. A membership function was designed and incorporated with the measured value to remove uncertainty and fuzzified data was used to predict the heart disease patients.. Further, an attempt was made to classify the patients based on the attributes collected from medical field. Minimum Euclidean distance Fuzzy K-NN classifier was designed to classify the training and testing data belonging to different classes. It was found that Fuzzy K-NN classifier suits well as compared with other classifiers of parametric techniques.

4.TITLE : Predictions in heart disease using techniques of data mining AUTHOR : Gandhi, Monika, and Shailendra Narayan Singh.
YEAR : 2015
DESCRIPTION
As huge amount of information is produced in medical associations (healing facilities, therapeutic focuses) yet

this information is not properly utilized. The health care system is "data rich" however "knowledge poor ". There is an absence of successful analysis methods to find connections and patterns in health care data. Data mining methods can help as remedy in this circumstance. For this reason, different data mining techniques can be utilized. The paper intends to give details about various techniques of knowledge abstraction by using data mining methods that are being used in today's research for prediction of heart disease. In this paper, data mining methods namely, Naive Bayes, Neural network, Decision tree algorithm are analyzed on medical data sets using algorithms.

5.TITLE : A survey of data mining techniques on risk prediction: Heart disease. AUTHOR :Purusothaman, G., and P. Krishnakumari.

YEAR : 2015

DESCRIPTION

Comparison of classification techniques in Data mining to find the best technique for creating risk prediction model of heart disease at minimum effort. In Data mining, different methods used to find risk prediction of heart disease. There are two types of model used in analysis of data. First one is applying single model to various heart data and another one is applying combined model to the data. The combined model also known as hybrid model. This paper provides a quick and easy understanding of various prediction models in data mining and helps to find best model for further work. This is unique approach because various techniques listed and expressed in bar chart to understand accuracy level of each. These techniques are chosen based on their efficiency in the literature. In previous studies of different researcher expressed their effort on finding best approach for risk prediction model and here we found best model by comparing those researcher's findings as survey. This survey helps to understand the recent techniques involved in risk prediction of heart disease at classification in data mining. Survey of relevant data mining techniques which are involved in risk prediction of heart disease provides best prediction model as hybrid approach comparing with single model approach.

6.TITLE : Human heart disease prediction system using data mining techniques AUTHOR : Thomas, J., and R. Theresa Princy.

YEAR : 2016

DESCRIPTION

Nowadays, health disease are increasing day by day due to life style, hereditary. Especially, heart disease has become more common these days, i.e. life of people is at risk. Each individual has different values for Blood pressure, cholesterol and pulse rate. But according to medically proven results the normal values of Blood pressure is 120/90, cholesterol is and pulse rate is 72. This paper gives the survey about different classification techniques used for predicting the risk level of each person based on age, gender, Blood pressure, cholesterol, pulse rate. The patient risk level is classified using data mining classification techniques such as Naïve Bayes, KNN, Decision Tree Algorithm, Neural Network. etc., Accuracy of the risk level is high when using more number of attributes.

4. PROPOSED SYSTEM

• The Heart Disease Prediction application is an end user support and online consultation project.
• Here, we propose a web application that allows users to get instant guidance on their heart disease through an intelligent system online.
• The application is fed with various details and the heart disease associated with those details.
• The application allows user to share their heart related issues.
• It then processes user specific details to check for various illness that could be associated with it.
• Here we use some intelligent data mining techniques to guess the most accurate illness that could be associated with patient's details.
• Based on result, system automatically shows the result specific doctors for further treatment.
• The system allows user to view doctor's details.
• The system can be use case of in emergency.
• The aim of this project is to diagnose different heart diseases and to make all possible precautions to prevent at early stage itself with affordable rate.
• We follow 'Data mining' technique in which attributes are fed in to SVM, Random forest, KNN, and ANN classification Algorithms for the prediction of heart diseases.

5. PROPOSED SYSTEM ADVANTAGES

• User can search for doctor's help at any point of time.
• User can talk about their Heart Disease and get instant diagnosis.
• Doctors get more clients online.
• Very useful in case of emergency.
• Better result accuracy.
• Reduced time complexity.

6. MODULE DESCRIPTION

In this research we offer transparent and controlled data access and processing, so that unauthorized users or untrusted servers cannot process passwords without client's authorization. Moreover, based on cryptographic

mechanisms, our solution preserves privacy of users passwords and ensures secrecy.

METHODOLOGIES

MODULES NAME:

This project having the following six modules:

➢ User Interface Design
➢ Admin
➢ User
➢ Hospital
➢ Doctor
➢ Lab Technician

MODULE EXPLANATION

➢ User Interface Design

This is the first module of our project. User Interface Design plays an important role for the user to move login web page to user web page. This module has created for the security purpose. In this login page we have to enter login user id and password. It will check username and password is match or not (valid user id and valid password). If we enter any invalid username or password we can't enter into login web page to user page it will shows error message. So we are preventing from unauthorized user entering into the login page to user page. It will provide a good security for our project. So server contain user id and password server also check the authentication of the user. It well improves the security and preventing from unauthorized user enters into the network. In our project we are using jsp for creating design. Here we validate the login user and sever authentication.

➢ Admin

This is the second module of our project no registration for admin only for login with help of admin name & password. Dataset is a collection of related sets of information that is composed of separate elements. Admin having some options like Add Doctor Details, View User Details, View Feedback, View Doc Details & View Test reports also.

➢ User Module

1. Register (With Details like Age, Sex, etc.)
2. Login user then send to symptoms to hospital then get appointment to doctor.
3. Take the required tests provided by the doctor.
4. Based on the reports know the risk level then if risk is high then admit in hospital or if risk is low take the precautions and medicine provided by doctor.
5. System will accordingly view Doctor to consult.
6. Give Feedback & View Doctors

➢ Hospital

This is the fourth module of our project no registration for hospital only for login with help of hospital name & password. After login verify user's symptoms then provide appointment with doctor. Then according to doctors reports if user wants to admit then provide the admission in the hospital otherwise provide medicine details. And take care of details, reports, and admission details of the user.

➢ Doctor

This is fifth module in our project in this module based on doctor information it works. Admin already adding some doctors based on name & password login in to application. Then First doctor register in administration staff then the particular doctor authorized to this organization. After that every time login in to hospital then checks the patient's condition and doctor checks patient medical reports. Then check the risk level and then based on the risk level doctor will provide some suggestions to hospital staff (either admission or medication details).

➢ Lab Technician

This is the final module of our project after login lab technicians might collect samples, study and perform tests on body fluids, teeth, chemical compounds, biological specimens, or other fields of science. Lab techs use various types of machinery, lab equipment and complex computer programs to perform their tests. Lab techs also record their data or findings for study and scrutiny by doctors and physicians. Sending the attribute values & view the tests to conduct user.

GIVEN INPUT EXPECTED OUTPUT:

➢ User Interface

Input: Enter login name and password.

Output: If valid user means directly open the home page otherwise show the error message and redirect to the registration page.

➢ Admin

Input: Admin Login enter name, Password.

Output: Admin login then verify all information like add doctors, doctors details, test details & user details.

➢ User

Input: User Login enter name, Password.

Output: User login then send symptoms & get risk level.

➢ Hospital

Input: Hospital authentication name and Password.

Output: Hospital login then verify users symptoms after that sending to doctor.

➢ Doctor

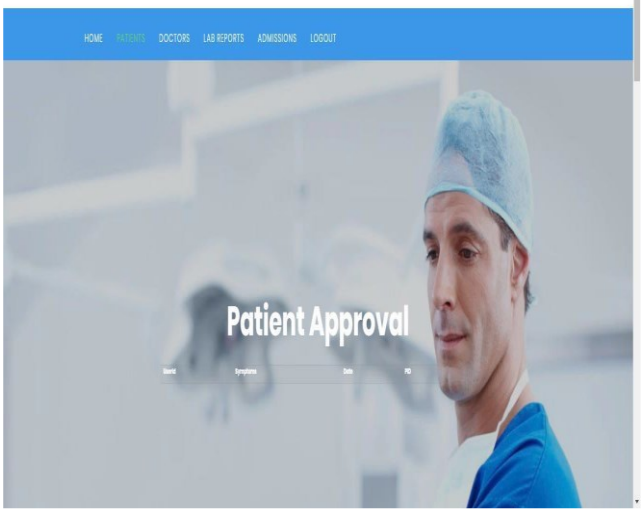
Input: Doctor login enter name & password.
Output: Doctor verifying symptoms then send for tests & checking risk levels

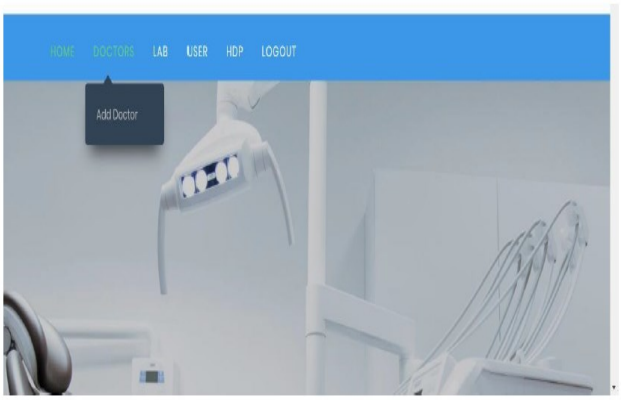
➢ Lab Technician

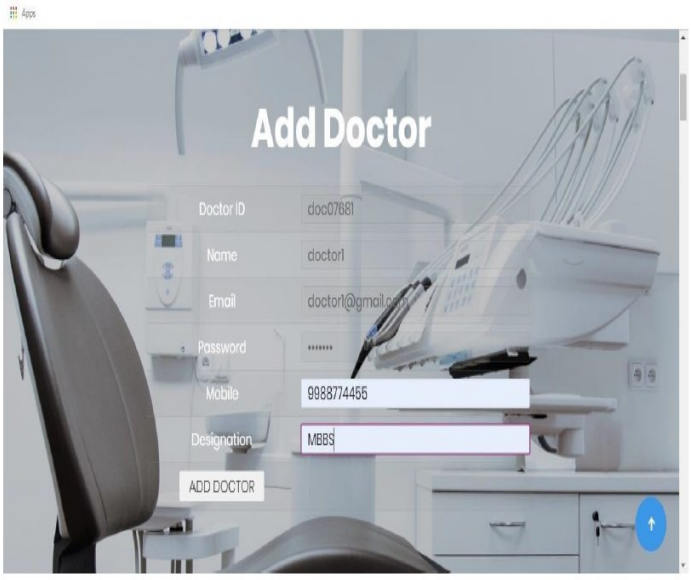
Input: Lab technician login enter name & password.
Output: Lab technician clicking on each symptoms then taken tests.

7. IMPLEMENTATION

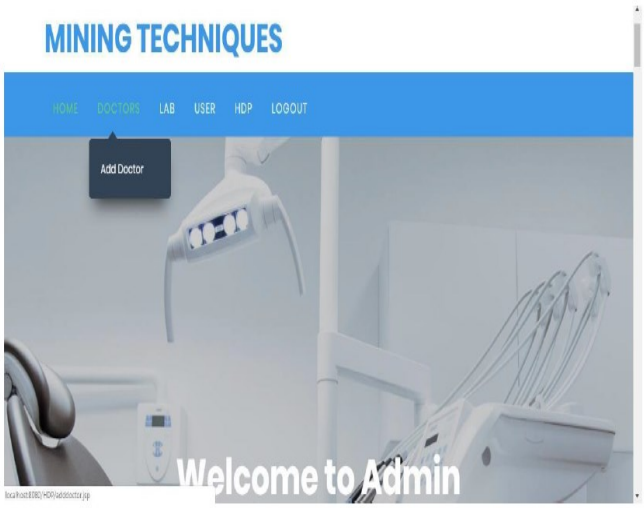
TECHNIQUES

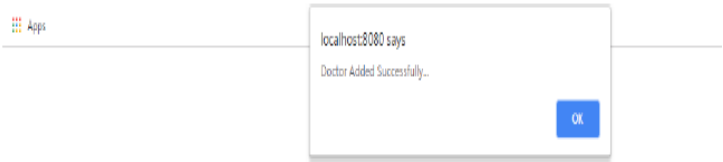


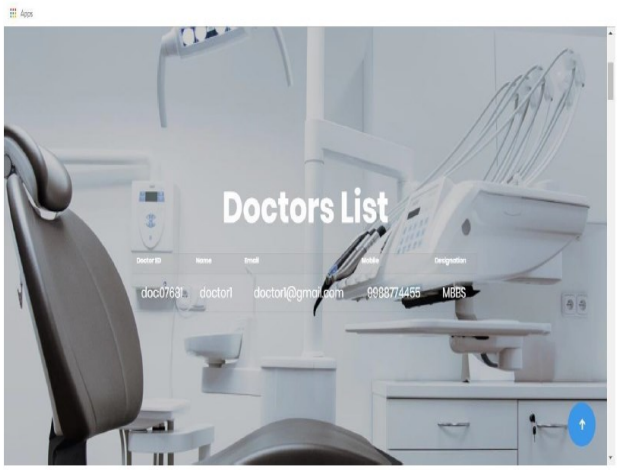


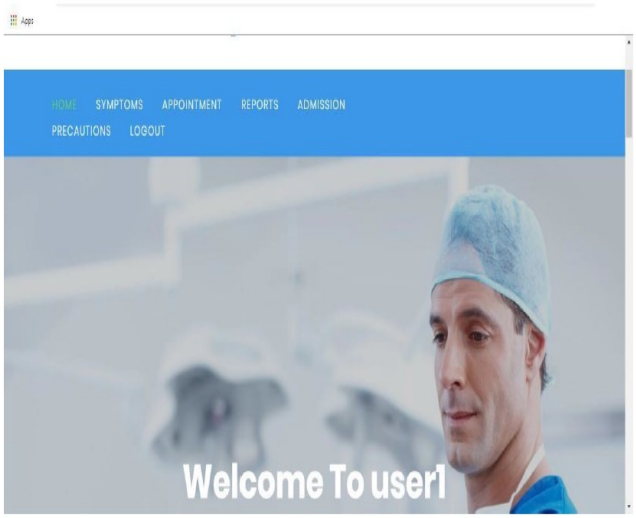


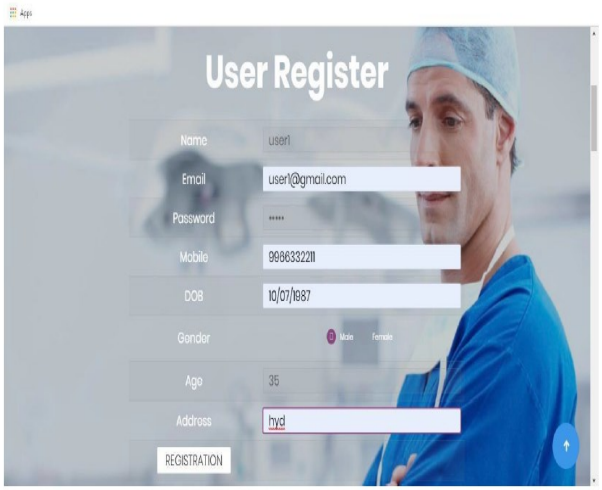
MINING TECHNIQUES

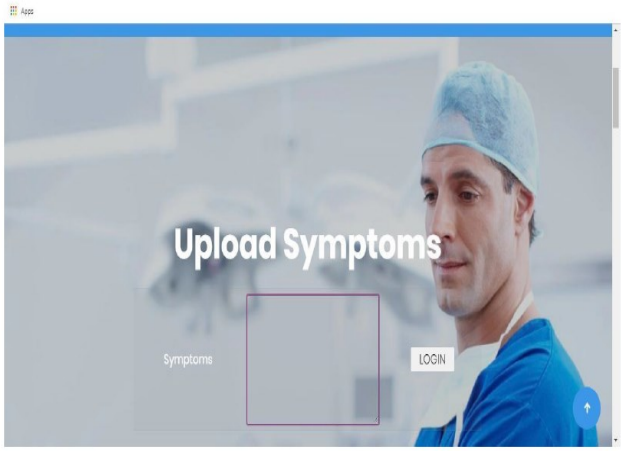


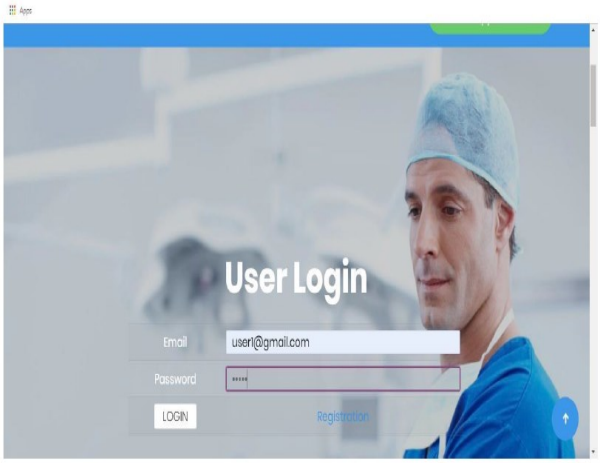


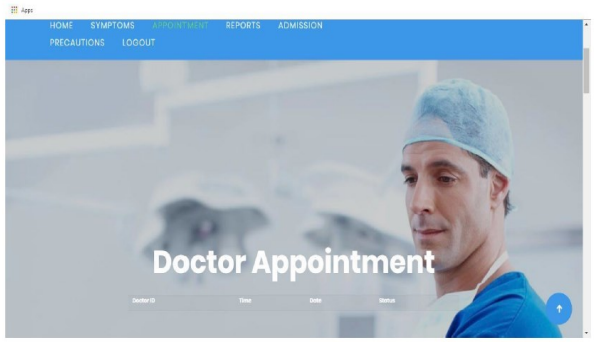

Doctors List
doctor1
MBBS

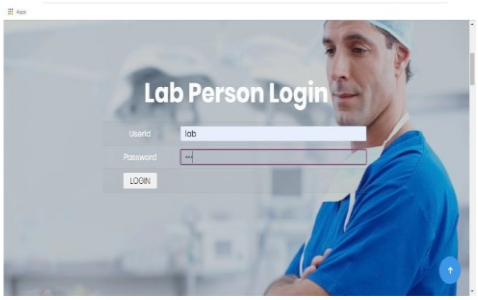

HOME
SYMPTOMS
APPOINTMENT
REPORTS
ADMISSION
PRECAUTIONS
LOGOUT
Welcome To user1

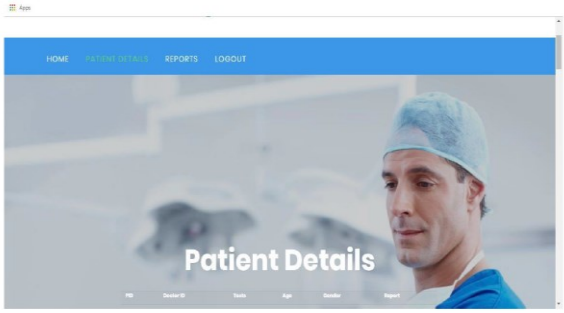

User Register
Name
user1
Email
user1@gmail.com
Password
Mobile
DOB
10/07/1987
Gender
Age
35
Address
hyd
REGISTRATION


Upload Symptoms
Symptoms
LOGIN


User Login
Email
user1@gmail.com
Password
LOGIN
Registration


HOME
SYMPTOMS
APPOINTMENT
REPORTS
ADMISSION
PRECAUTIONS
LOGOUT
Doctor Appointment





8. CONCLUSION

The main motivation of this project is to provide an insight about detecting and curing heart disease using data mining technique. For data mining, data were collected from jubilee mission hospital Thrissur. Collection of data was carried by interacting with patients one to one and jotting it down .The other mode of collecting data was from discharge summary of the respective patients .In such a way, a total 20 attributes of nearly 2200 and above patients were collected.This collected data were then sorted and arranged systematically in Excel format. Using this data, it can be subjected to different data mining algorithms. From the medical profiles twenty attributes are extracted such as age, sex, blood pressure and blood sugar etc. to predict the likelihood of patient getting heart diseases. These attributes are fed in to SVM, Random forest, KNN, and ANN classification Algorithms in which ANN gave the best result with the highest accuracy. Valid performance is achieved using ANN algorithm in diagnosing heart diseases and can be further improved by increasing the number of attributes.

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MITIGATING DENIAL OF SERVICE ATTACKS ON THE CHORD OVERLAY NETWORK: A LOCAL HIDING APPROACH

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ABSTRACT- An overlay network is a virtual network formed by nodes (desktop workstations) on top of an existing TCP/IP-network. Overlay networks typically support a lookup protocol. A lookup operation identifies the location of a file given its filename. Location of a file denotes the IP-address of the node that currently hosts the file. This project is a location hiding approach for mitigating the denial of service attacks on the chord overlay network. Server less distributed computing has received significant attention from both the industry and the research community. Among the most popular applications are the wide-area network file systems, exemplified by CFS, Farsite, and OceanStore. These file systems store files on a large collection of untrusted nodes that form an overlay network. They use cryptographic techniques to maintain file confidentiality and integrity from malicious nodes. Unfortunately, cryptographic techniques cannot protect a file holder from a denial-of-service (DoS) attack or a host compromise attack. Hence, most of these distributed file systems are vulnerable to targeted file attacks, wherein an adversary attempts to attack a small (chosen) set of files by attacking the nodes that host them.
KEYWORDS: denial-of-service attack, Smurf attack, Ping flood, and Ping of death, Teardrop attacks, Peer-to-peer attack

1. INTRODUCTION

This paper presents Location Guard-A location hiding technique for securing overlay file storage systems from targeted file attacks. Our experimental results quantify the overhead of employing LocationGuard and demonstrate its effectiveness against DoS attacks, host compromise attacks, and various location inference attacks. A file lookup is guaranteed to succeed if and only if the file is present in the system. A file lookup terminates in a small and bounded number of hops. The files are uniformly distributed among all active nodes. The system handles dynamic node joins and leaves. Several server less file storage services, like CFS, Farsite, OceanStore, and SiRiUS, have recently emerged. An overlay network is a virtual network formed by nodes (desktop workstations) on top of an existing TCP/IP-network. A major drawback with server less file systems is that they are vulnerable to targeted attacks on files. The fundamental problem with these systems is that: 1) the number of replicas maintained by the system is usually much smaller than the number of malicious nodes. Server less file storage services are faced with the challenge of having to harness the collective resources of loosely coupled, insecure, and unreliable machines to provide a secure and reliable file storage service. In this paper, we present LocationGuard as an effective technique for countering targeted file attacks. The fundamental idea behind LocationGuard is to hide the very location of a file and its replicas such that a legal user who possesses a file's location key can easily and securely locate the file on the overlay network; but without knowing the file's location key, an adversary would not be able to even locate the file, let alone access it or attempt to attack it. LocationGuard implements an efficient capability-based file access control mechanism through three essential components.

2. LITERATURE REVIEW

A denial-of-service attack (DoS attack) or distributed denial-of-service attack (DDoS attack) is an attempt to make a computer resource unavailable to its intended users. Although the means to carry out, motives for, and targets of a DoS attack may vary, it generally consists of the concerted efforts of a person or people to prevent an Internet site or service from functioning efficiently or at all, temporarily or indefinitely. Perpetrators of DoS attacks typically target sites or services hosted on high-profile web servers such as banks, credit card payment gateways, and even root name servers. One common method of attack involves saturating the target (victim)

machine with external communications requests, such that it cannot respond to legitimate traffic, or responds so slowly as to be rendered effectively unavailable. In general terms, DoS attacks are implemented by either forcing the targeted computer(s) to reset, or consuming its resources so that it can no longer provide its intended service or obstructing the communication media between the intended users and the victim so that they can no longer communicate adequately.

Denial-of-service attacks are considered violations of the IAB's Internet proper use policy, and also violate the acceptable use policies of virtually all Internet Service Providers. They also commonly constitute violations of the laws of individual nations.

Means: As there are two main types of attack (wired and wireless), different material is to be used for each of the two types. Attacks on wired networks require a great deal of computing power, often even requiring the need of distributed computing. Attacks on wired networks do not require any NICs or external antennae, yet often do have the need of a (broadband) connection to the Internet.

Denial-of-service attacks can also lead to problems in the network 'branches' around the actual computer being attacked. For example, the bandwidth of a router between the Internet and a LAN may be consumed by an attack, compromising not only the intended computer, but also the entire network. If the attack is conducted on a sufficiently large scale, entire geographical regions of Internet connectivity can be compromised without the attacker's knowledge or intent by incorrectly configured or flimsy network infrastructure equipment.

Methods of attack: A "denial-of-service" attack is characterized by an explicit attempt by attackers to prevent legitimate users of a service from using that service. Attacks can be directed at any network device, including attacks on routing devices and web, electronic mail, or System servers. A DoS attack can be perpetrated in a number of ways. The five basic types of attack are:

Consumption of computational resources, such as bandwidth, disk space, or processor time

Disruption of configuration information, such as routing information.

Disruption of state information, such as unsolicited resetting of TCP sessions.

Disruption of physical network components.

Obstructing the communication media between the intended users and the victim so that they can no longer communicate adequately.

A DoS attack may include execution of malware intended to these. Max out the processor's usage, preventing any work from occurring. Trigger errors in the microcode of the machine.

Trigger errors in the sequencing of instructions, so as to force the computer into an unstable state or lock-up. Exploit errors in the operating system, causing resource starvation and/or thrashing, i.e. to use up all available facilities so no real work can be accomplished. Crash the operating system itself.

ICMP flood: A smurf attack is one particular variant of a flooding DoS attack on the public Internet. It relies on misconfigured network devices that allow packets to be sent to all computer hosts on a particular network via the broadcast address of the network, rather than a specific machine. The network then serves as a smurf amplifier. In such an attack, the perpetrators will send large numbers of IP packets with the source address faked to appear to be the address of the victim. The network's bandwidth is quickly used up, preventing legitimate packets from getting through to their destination. To combat Denial of Service attacks on the Internet, services like the Smurf Amplifier Registry have given network service providers the ability to identify misconfigured networks and to take appropriate action such as filtering. Ping flood is based on sending the victim an overwhelming number of ping packets, usually using the "ping" command from UNIX like hosts (the -t flag on Windows systems has a far less malignant function). It is very simple to launch, the primary requirement being access to greater bandwidth than the victim. SYN flood sends a flood of TCP/SYN packets, often with a forged sender address. Each of these packets is handled like a connection request, causing the server to spawn a half-open connection, by sending back a TCP/SYN-ACK packet, and waiting for a packet in response from the sender address. However, because the sender address is forged, the response never comes. These half-open connections saturate the number of available connections the server is able to make, keeping it from responding to legitimate requests until after the attack ends.

Teardrop attacks: A Teardrop attack involves sending mangledIP fragments with overlapping, over-sized payloads to the target machine. This can crash various operating systems due to a bug in their TCP/IPfragmentation re-assembly code. Windows 3.1x, Windows 95 and Windows NT operating systems, as well as versions of Linux prior to versions 2.0.32 and 2.1.63 are vulnerable to this attack.

Peer-to-peer attacks: Attackers have found a way to exploit a number of bugs in peer-to-peer servers to initiate DDoS attacks. The most aggressive of these peer-

to-peer-DDoS attacks exploits DC++. Peer-to-peer attacks are different from regular botnet-based attacks. With peer-to-peer there is no botnet and the attacker does not have to communicate with the clients it subverts. Instead, the attacker acts as a 'puppet master,' instructing clients of large peer-to-peer file sharing hubs to disconnect from their peer-to-peer network and to connect to the victim's website instead. As a result, several thousand computers may aggressively try to connect to a target website. While a typical web server can handle a few hundred connections/sec before performance begins to degrade, most web servers fail almost instantly under five or six thousand connections/sec. With a moderately big peer-to-peer attack a site could potentially be hit with up to 750,000 connections in a short order. The targeted web server will be plugged up by the incoming connections. While peer-to-peer attacks are easy to identify with signatures, the large number of IP addresses that need to be blocked (often over 250,000 during the course of a big attack) means that this type of attack can overwhelm mitigation defenses. Even if a mitigation device can keep blocking IP addresses, there are other problems to consider. For instance, there is a brief moment where the connection is opened on the server side before the signature itself comes through. Only once the connection is opened to the server can the identifying signature be sent and detected, and the connection torn down. Even tearing down connections takes server resources and can harm the server. This method of attack can be prevented by specifying in the p2p protocol which ports are allowed or not. If port 80 is not allowed, the possibilities for attack on websites can be very limited.

Permanent denial-of-service attacks: A permanent denial-of-service (PDoS), also known loosely as plashing, is an attack that damages a system so badly that it requires replacement or reinstallation of hardware. Unlike the distributed denial-of-service attack, a PDoS attack exploits security flaws in the remote management interfaces of the victim's hardware, be it routers, printers, or other networking hardware. These flaws leave the door open for an attacker to remotely 'update' the device firmware to a modified, corrupt or defective firmware image, therefore "bricking" the device and making it permanently unusable for its original purpose. The PDoS is a pure hardware targeted attack which can be much faster and requires fewer resources than using a botnet in a DDoS attack. Because of these features, and the potential and high probability of security exploits on Network Enabled Embedded Devices (NEEDs), this technique has come to the attention of numerous hacker communities. PhlashDance is a tool created by Rich Smith[7] (an employee of Hewlett-Packard's Systems Security Lab) used to detect and demonstrate PDoS vulnerabilities at the 2008 EUSecWest Applied Security Conference in London. A "banana attack" is another particular type of DoS. It involves redirecting outgoing messages from the client back onto the client, preventing outside access, as well as flooding the client with the sent packets. An attacker with access to a victim's computer may slow it until it is unusable or crash it by using a fork bomb.

Nuke: A Nuke is an old denial-of-service attack against computer networks consisting of fragmented or otherwise invalid ICMP packets sent to the target, achieved by using a modified ping utility to repeatedly send this corrupt data, thus slowing down the affected computer until it comes to a complete stop. In online gaming, nuking is used by spamming another user, or all other users, with random repeated messages in quick succession. Such techniques are also seen in instant messaging programs as repeatedly sending text can be assigned to a macro or AppleScript. Modern operating systems are usually resistant to these nuke attacks, and online games now have third party "Flood control." A specific example of a nuke attack that gained some prominence is the WinNuke, which exploited the vulnerability in the NetBIOS handler in Windows 95. A string of out-of-band data was sent to TCP port 139 of the victim's machine, causing it to lock up and display a Blue Screen of Death (BSOD).

Distributed Attack: A distributed denial of service attack (DDoS) occurs when multiple systems flood the bandwidth or resources of a targeted system, usually one or more web servers. These systems are compromised by attackers using a variety of methods. Malware can carry DDoS attack mechanisms; one of the better-known examples of this was MyDoom. Its DoS mechanism was triggered on a specific date and time. This type of DDoS involved hardcoding the target IP address prior to release of the malware and no further interaction was necessary to launch the attack. A system may also be compromised with a trojan, allowing the attacker to download a zombie agent (or the trojan may contain one). Attackers can also break into systems using automated tools that exploit flaws in programs that listen for connections from remote hosts. This scenario primarily concerns systems acting as servers on the web. Stacheldraht is a classic example of a DDoS tool. It utilizes a layered structure where the attacker uses a client program to connect to handlers, which are compromised systems that issue commands to the zombie agents, which in turn

facilitate the DDoS attack. Agents are compromised via the handlers by the attacker, using automated routines to exploit vulnerabilities in programs that accept remote connections running on the targeted remote hosts. Each handler can control up to a thousand agents.

3. PROPOSED WORK

The adversary could collect the capabilities (tokens) of the file replicasstored at compromised nodes; these tokens can be used bythe adversary at any point in future to corrupt these replicasusing a simple write operation. Hence, our second experimenton host compromise attack measures the probabilityof an attack assuming that the adversary collects the filetokens stored at compromised nodes. Fig. 10 shows themean effort required to locate all the replicas of a target fileðcr ¼ RÞ. The effort required is expressed in terms of thefraction of good nodes that need to be compromised by theadversary to attack the target file. A new concept for file management is the concept of a database-based file system. Instead of, or in addition to, hierarchical structured management, files are identified by their characteristics, like type of file, topic, author, or similar metadata.

In transactional file systems Each disk operation may involve changes to a number of different files and disk structures. In many cases, these changes are related, meaning that it is important that they all be executed at the same time. Take for example a bank sending another bank some money electronically. The bank's computer will "send" the transfer instruction to the other bank and also update its own records to indicate the transfer has occurred. If for some reason the computer crashes before it has had a chance to update its own records, then on reset, there will be no record of the transfer but the bank will be missing some money. Transaction processing introduces the guarantee that at any point while it is running, a transaction can either be finished completely or reverted completely (though not necessarily both at any given point. This means that if there is a crash or power failure, after recovery, the stored state will be consistent. Either the money will be transferred or it will not be transferred, but it won't ever go missing "in transit. This type of file system is designed to be fault tolerant, but may incur additional overhead to do so. Journaling file systems are one technique used to introduce transaction-level consistency to filesystem structures.

4. CONCLUSION

We have described LocationGuard—a technique for securing wide-area serverless file sharing systems from targeted file attacks. Analogous to traditional cryptographic keys that hide the contents of a file, LocationGuard hides the location of a file on an overlay network. LocationGuard protects a target file from DoS attacks, host compromise attacks, and file location inference attacks by providing a simple and efficient access control mechanism with minimal performance and storage overhead. The unique characteristics of LocationGuard approach is the careful combination of location key, routing guard, and an extensible package of location inference guards, which makes it very hard for an adversary to infer the location of a target file by either actively or passively observing the overlay network. Our experimental results quantify the overhead of employing location guards and demonstrate the effectiveness of the LocationGuard scheme against DoS attacks, host compromise attacks, and various location inference attacks.

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ACHIEVING EFFECTIVE CLOUD STORAGE SERVICES: MULTIKEYWORD RANKED SEARCHOVER ENCRYPTED CLOUD DATA SUPPORTING SYNONYM QUERY

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ABSTRACT-In this paper we focus on remote data integrity checking is of essential importance in cloud storage. As Cloud Computing becomes prevalent, more and more sensitive information are being centralized into the cloud. The clients verify whether their outsourced data is kept intact without downloading the whole data in a multi-cloud storage. In some application scenarios, the clients have to store their data on multi-cloud servers. At the same time, the integrity checking protocol must be efficient in order to reduce the verifier's cost. From the two points, we propose a novel remote data integrity checking model: ID-DPDP (identity-based distributed provable data possession) in multi-cloud storage. The proposed ID-DPDP protocol can have two models the formal system model and security model are given compare to the bilinear pairings, a concrete ID-DPDP protocol is designed. The proposed ID-DPDP protocol is provably secure under the hardness assumption of the standard CDH (computational Diffie-Hellman) problem. The structural advantage also elimination of certificate management, our ID-DPDP protocol is also efficient and flexible. Based on the client's authorization, the proposed ID-DPDP protocol can realize private verification, delegated verification and public verification.

KEY WORD: ID-DPDP Protocol, CDH (Computational Diffie-Hellman, Symmetric Encryption (SSE), Multi-Keyword Ranked Search Scheme, Vector Space Model (VSM). Order-Preserving Symmetric Encryption (OPSE)

1. INTRODUCTION

In recent years, Cloud Computing paradigm provides a variety of service to the consumers. many consumer electronic devices (e.g. Smartphone) with support of high speed computing combined with the emerging cloud. A cloud computing middleware Media Cloud for set top boxes for classifying, searching, and delivering media inside home network and across the cloud. The system can analyze and use the viewing pattern of consumers to personalize the program recommendations. However, all these services are likely to be available to consumers only with the premise that an effective and efficient cloud search service is achieved. Consumers want to find the most relevant products or data, which is highly desirable in the "pay-as-you use" cloud computing paradigm. One hand, consumer-centric cloud computing a new model of enterprise-level IT infrastructure that provides on demand high quality applications and services from a shared pool of configuration computing resources for consumers. On the other hand, some problems may be caused in this circumstance since the Cloud Service Provider (CSP) possesses full control of the outsourced data. So sensitive data are encrypted before outsourcing to the cloud. However, encrypted data make the traditional data utilization services based on plaintext keyword search useless. The simple and embarrassed method of downloading all the data and decrypting locally is obviously impractical, because the authorized cloud consumers must hope to search their interested data rather than all the data

2. LITERATURE REVIEW

With the increasing popularity of cloud computing, huge amount of documents are outsourced to the cloud for reduced management cost and ease of access. Although encryption helps protecting user data confidentiality, it leaves the well-functioning yet practically-efficient secure search functions over encrypted data a challenging problem. In this paper, we present a privacy-preserving multi-keyword text search (MTS) scheme with similarity-based ranking to address this problem. To support multi-keyword search and search result ranking, we propose to build the search index based on term frequency and the vector space model with cosine

similarity measure to achieve higher search result accuracy.

To improve the search efficiency, we propose a tree-based index structure and various adaption methods for multi-dimensional (MD) algorithm so that the practical search efficiency is much better than that of linear search. To further enhance the search privacy, we propose two secure index schemes to meet the stringent privacy requirements under strong threat models, i.e., known cipher text model and known background model. Finally, we demonstrate the effectiveness and efficiency of the proposed schemes through extensive experimental evaluation. Traditional electronic program guides (EPGs) cannot be used to find popular TV programs. A personalized digital video broadcasting – terrestrial (DVB-T) digital TV program recommendation system is ideal for providing TV program suggestions based on statistics results obtained from analyzing large-scale data. The frequency and duration of the programs that users have watched are collected and weighted by data mining techniques. A large dataset produces results that best represent a viewer's preferences of TV programs in a specific area. To process such a massive amount viewer preference data, the bottleneck of scalability and computing power must be removed. In this paper, an architecture for a TV program recommendation system based on cloud computing and a map-reduce framework, the map-reduce version of k-means and the k-nearest neighbor (kNN) algorithm, is introduced and applied.

The proposed architecture provides a scalable and powerful backend to support the demand of large-scale data processing for a program recommendation system. With the advent of cloud computing, data owners are motivated to outsource their complex data management systems from local sites to the commercial public cloud for great flexibility and economic savings. But for protecting data privacy, sensitive data has to be encrypted before outsourcing, which obsoletes traditional data utilization based on plaintext keyword search. Thus, enabling an encrypted cloud data search service is of paramount importance. Considering the large number of data users and documents in the cloud, it is necessary to allow multiple keywords in the search request and return documents in the order of their relevance to these keywords.

Related works on searchable encryption focus on single keyword search or Boolean keyword search, and rarely sort the search results. In this paper, for the first time, we define and solve the challenging problem of privacy preserving multi-keyword ranked search over encrypted cloud data (MRSE).We establish a set of strict privacy requirements for such a secure cloud data utilization system. Among various multikeyword semantics, we choose the efficient similarity measure of "coordinate matching", i.e., as many matches as possible, to capture the relevance of data documents to the search query. We further use "inner product similarity" to quantitatively evaluate such similarity measure. We first propose a basic idea for the MRSE based on secure inner product computation, and then give two significantly improved MRSE schemes to achieve various stringent privacy requirements in two different threat models. Thorough analysis investigating privacy and efficiency guarantees of proposed schemes is given. Experiments on the real-world dataset further show proposed schemes indeed introduce low overhead on computation and communication.

As Cloud Computing becomes prevalent, sensitive information are being increasingly centralized into the cloud. For the protection of data privacy, sensitive data has to be encrypted before outsourcing, which makes effective data utilization a very challenging task. Although traditional searchable encryption schemes allow users to securely search over encrypted data through keywords, these techniques support only Boolean search, without capturing any relevance of data files. This approach suffers from two main drawbacks when directly applied in the context of Cloud Computing. On the one hand, users, who do not necessarily have pre-knowledge of the encrypted cloud data, have to post process every retrieved file in order to find ones most matching their interest; On the other hand, invariably retrieving all files containing the queried keyword further incurs unnecessary network traffic, which is absolutely undesirable in today's pay-as-you-use cloud paradigm. In this paper, for the first time we define and solve the problem of effective yet secure ranked keyword search over encrypted cloud data. Ranked search greatly enhances system usability by returning the matching files in a ranked order regarding to certain relevance criteria (e.g., keyword frequency), thus making one step closer towards practical deployment of privacy-preserving data hosting services in Cloud Computing. We first give a straightforward yet ideal construction of ranked keyword search under the state-of-the-art searchable symmetric encryption (SSE) security definition, and demonstrate its inefficiency.

To achieve more practical performance, we then propose a definition for ranked searchable symmetric encryption, and give an efficient design by properly utilizing the existing cryptographic primitive, order-preserving symmetric encryption (OPSE). The analysis shows that

our proposed solution enjoys "as-strong-as possible" security guarantee compared to previous SSE schemes, while correctly realizing the goal of ranked keyword search. Extensive experimental results demonstrate the efficiency of the proposed solution. As Cloud Computing becomes prevalent, more and more sensitive information are being centralized into the cloud. For the protection of data privacy, sensitive data usually have to be encrypted before outsourcing, which makes effective data utilization a very challenging task. Although traditional searchable encryption schemes allow a user to securely search over encrypted data through keywords and selectively retrieve files of interest, these techniques support only exact keyword search. That is, there is no tolerance of minor typos and format inconsistencies which, on the other hand, are typical user searching behavior and happen very frequently. This significant drawback makes existing techniques unsuitable in Cloud Computing as it greatly affects system usability, rendering user searching experiences very frustrating and system efficacy very low. In this paper, for the first time we formalize and solve the problem of effective fuzzy keyword search over encrypted cloud data while maintaining keyword privacy. Fuzzy keyword search greatly enhances system usability by returning the matching files when users' searching inputs exactly match the predefined keywords or the closest possible matching files based on keyword similarity semantics, when exact match fails. In our solution, we exploit edit distance to quantify keywords similarity and develop an advanced technique on constructing fuzzy keyword sets, which greatly reduces the storage and representation overheads. Through rigorous security analysis, we show that our proposed solution is secure and privacy-preserving, while correctly realizing the goal of fuzzy keyword search. Advances in networking technology and an increase in the need for computing resources have prompted many organizations to outsource their storage and computing needs. This new economic and computing model is commonly referred to as cloud computing and includes various types of services such as: infrastructure as a service (IaaS), where a customer makes use of a service provider's computing, storage or networking infrastructure; platform as a service (PaaS), where a customer leverages the provider's resources to run custom applications; and finally software as a service (SaaS), where customers use software that is run on the provider's infrastructure.

Cloud infrastructures can be roughly categorized as either private or public. In a private cloud, the infrastructure is managed and owned by the customer and located on-premise (i.e., in the customer's region of control). In particular, this means that access to customer data is under its control and is only granted to parties it trusts. In a public cloud the infrastructure is owned and managed by a cloud service provider and is located off-premise (i.e., in the cloud service provider's region of control). This means that customer data is outside its control and could potentially be granted to untrusted parties. Cloud computing allows accessing resources across Internet transparently: requiring no expertise in, or control over the underlying infrastructure. There is an increasing interest in sharing media files with family and friends. However, UPnP or DLNA were not designed for media distribution beyond the boundaries of a local network and manage media files through web applications can be tedious. To overcome this problem, we propose Media Cloud, a middleware for Set-top boxes for classifying, searching, and delivering media inside home network and across the cloud that interoperates with UPnP and DLNA.

3. EXISTING SYSTEM

In the existing process, we send the data encrypted to cloud. But the data support only exact or fuzzy keyword search, but not semantics-based multi-keyword ranked search. To enable an effective searchable system with support of ranked search remains a very challenging. There is no tolerance of synonym substitution and syntactic variation. Therefore, synonym-based multi-keyword ranked search over encrypted cloud data remains a very challenging problem.

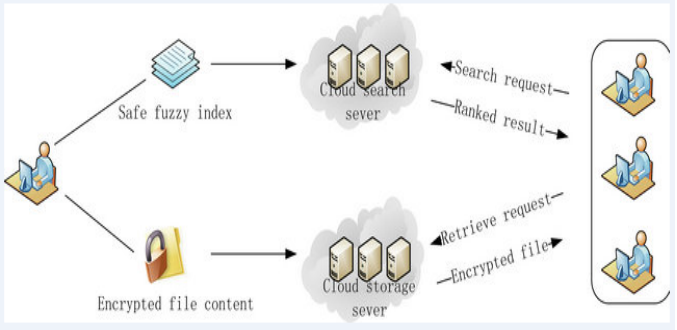
4. PROPOSED WORK

We worked on real-world dataset and tried to show that the condition is very effective and efficient for multi keyword ranked searching in a cloud. The semantics-based multi-keyword ranked search technology for encrypted cloud data which also supports synonym i.e. relative words. It supports every related works through single keyword search. A multi-keyword ranked search scheme based on vector space model (VSM). Ranked search scheme, in which by giving each keyword a weight TF-IDF, the cloud server can rank relevant data files.

5. ARCHITECTURE

The users or nodes involved in our projects are Sender, Intermediate and Receiver. In order to send file, the sender has to find out the list of nodes which are connected with the sender. From that available list he can choose receiver. Then the sender has to analyze the performance of each and every node which is connected with the sender. The performance analysis list will return the priority based result so that sender can choose the

intermediate to send the file. The Intermediate will receive the file from sender then it will analyze the performance so that it can send data to another intermediate or receiver. In the receiver side, the receiver has to select the file path to receive the file from sender or intermediate. Then the receiver can view the file received file.



6. MODULES DESCRIPTION

CLOUD OWNER: Authentication, Dataset Analysis, Encryption, File Upload

USERS: Authentication, Synonym Search, File Download

If you are the new user going to consume the service then they have to register first by providing necessary details. After successful completion of sign up process, the user has to login into the application by providing username and exact password. The user has to provide exact username and password which was provided at the time of registration, if login success means it will take up to main page else it will remain in the login page itself.

DATA SET ANALYSIS: In data set analysis Cloud users can store valuable intermediate data sets selectively when processing original data sets in data intensive applications like medical diagnosis, which intermediate data sets need to be encrypted while others do not, in order to satisfy privacy requirements given by data holders.

FILE UPLOAD: In this scheme data owner upload the files in the cloud server. Each service has different set of files. Data owner collect several file from the local path and stored in the Cloud Server. This cloud server has collection of server cluster which uniquely connected with the cloud server.

ENCRYPTION: A knowledgeable user can generate a proc contents and have access to variable descriptions on any unprotected data set. Once the file is accessed, a user can expose, and/or manipulate sensitive data. Passwords, DOS commands, and various System options and procedures can limit unauthorized access to a data set. The use of encryption algorithms for sensitive data variables within the data set provides additional assurance against unauthorized tampering especially when the data set is shared.

VIEW DETAILS: In this scheme user after the successful login goes to view the no of files in the cloud server. Each service has different set of files. This cloud server has collection of server cluster which uniquely connected with the cloud server.

SYNONYM SEARCH: In this scheme, if user selects a particular file means there will group of synonym keywords to download that particular file from the cloud server. It uses to checks keyword in database.

FILE DOWNLOAD: In this scheme, User uses to download the files in the cloud server. Each service has different set of files. User can collect several file by downloading, which are stored in the Cloud Server. This cloud server has collection of server cluster which uniquely connected with the cloud server.

7. CONCLUSION

For the first time, proposes an effective approach to solve the problem of synonym-based multikeyword ranked search over encrypted cloud data. The main contributions are summarized in two aspects: synonym-based search and similarity ranked search. The search results can be achieved when authorized cloud customers input the synonyms of the predefined keywords, not the exact or fuzzy matching keywords, due to the possible synonym substitution and/or her lack of exact knowledge about the data. The vector space model is adopted combined with cosine measure, which is popular in information retrieval field, to evaluate the similarity between search request and document. Finally, the performance of the proposed schemes is analyzed in detail, including search efficiency and search accuracy, by the experiment on real-world dataset. The results show that the proposed solution is very efficient and effective in supporting synonym-based searching.

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A STUDY OF INFLUENTIAL FACTORS OF EMPLOYEE MOTIVATION PERCEIVED IN BANKING SECTOR- WITH REFERENCE TO ICICI BANK

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ABSTRACT-The management need to carefully understand the minuscule requirements of the workers and simultaneously the corresponding incentives to offer so as to achieve a perfect fit. At this juncture it is imperative to conduct and further the research work in this context in the Indian scenario in any select industry. This research might possibly be able to give an insight into some motivational dynamics and ultimately enable motivated members to realize the organizational goal and underwrite their best efforts for the realization of organizational goal and achieve their personal goals also. In this study attempt have been made to identify the most important factors of motivation generally perceived by employees in banking context. Further to study the methods of motivation practiced in the ICICI bank. The most powerful motivating factors perceived by employees in order of preference are Hike in Salary/ wage, Performance-based bonuses, Benefits (health insurance/ stock options/ vacation or sick pay), Opportunity for promotions, Appreciation for good work, Flexible Working Schedule and Company Social Gatherings.
Key Points:Employee Motivation, Satisfaction, Motivating factors, Incentives

1. INTRODUCTION

For an organization to be effective, an enlightened, motivated and job satisfied body of employees should be its main objective. To be motivated means to be engaged in a goal directed conductwhich begins with the individual feeling certain needs (also referred to as drives and motives). These needs give an energizing thrust to the individual toincentives which she/hedistinguishes rightly or wrongly as possible satisfiers of his need. The goal which is external to the individual only provides him with the opportunity for satisfying his internal needs. It is tough to explicate and predict the behaviour of an individual. The outline of an ostensiblyfavorable motivational technique may not necessarily achieve the desired results as motivation remains a complex and intriguing phenomenon. as man is a complex being, he has several motives, which weave into a unique need pattern at any one time. Hence employees need to be studied and motivated separately. Motivation of an employee may variatealbeit he may linger to behave in the same manner. Motivation is also expressed in different ways. For instance, one soul with a robust security need may dodgeresponsibilities for the fear of failing to fulfil the responsibility and the fear of being fired. Another employee may seek responsibility, having the same security need but, for the anxiety of being fired for low routine.

2. NEED OF THE STUDY

The force of motivation is anenergeticpower setting a person into motion or action. In different settings and in different organizations, at different levels, different individuals have different problems. In so complex situation various theories only add to the thoughtfulness of attitudes of the people and not a wholistic overview of the surroundings. In the modern enlightened world where the aims of the employees are being aroused through the spread of mass education, the old carrot-and-stick approach to motivate people is no longer relevant and effective. The management need to carefully understand the minuscule requirements of the workers and simultaneously the corresponding incentives to offer so as to achieve a perfect fit. At this juncture it is imperative to conduct and further the research work in this context in the Indian scenario in any select industry. This research might possibly be able to give an insight into some motivational dynamics and ultimatelyenable motivated members to realize the organizational goal and

underwrite their best efforts for the realization of organizational goal and achieve their personal goals also.

3. RESEARCH GAP

Researchers on employee motivation in India have mostly followed the pattern of investigations set by their counterparts in the West. Their studies are either correlational or attitudinal or replication studies to test findings of researches carried out elsewhere. Other studies of 2-factor theory posit that security and salary (extrinsic rewards) are considered more important by employees in India then job design, autonomy, and other-related factors. Ishwar Dayal and Mirza Saiyadin (1970) however, support the Motivation Hygiene Theory. Lahiri and Srivastava (1967) support the theory only partially. They say that the satisfied and dissatisfied feelings are unipolar but both intrinsic and extrinsic factors contribute to satisfied and dissatisfied feelings. A study of 150 supervisors of textile mills in Ahmedabad by Atira in 1970 found that recognition and work do not act as motivators and peer relationships and working conditions do not operate as hygiene factors. Achievement, responsibility and advancement, besides salary, act as definite motivators.

4. OBJECTIVES OF THE STUDY

- To identify the most important factors of motivation generally perceived by employees in banking context.
- To study the methods of motivation practiced in the ICICI bank.
- To identify the level of satisfaction with respect to present incentives provided by ICICI bank.
- To study the perception of performance appraisal systems in ICICI bank
- To identify hindering and facilitating factors pertaining to motivation in ICICI bank.
- To suggest improvement in the motivation policies in ICICI bank.

5. SCOPE OF THE STUDY

- Handling of anextensive area or the entire state also can be taken for impending studyin order tosurge the simplification of the outcome of worker motivation in banking.
- The methods can be simulated in other service industry in the country or in a different industry.
- With minor changes and modification, the method and measurement of motivation can be applied to other areas like communication sector, transportation sector etc.
- Future research should concentrate on new and developing geographical areas, different sample size and all types of retail banks including foreign banks.
- Further research is required to scrutinize the differences in the perception related to motivation amongst group such as minorities and migrants.

6. RESEARCH METHODOLOGY

Research Design:

A Descriptive Research Design has been adopted and a Survey Method have been used.

Survey method was careful used and a structured questionnaire was administered through personal contact method to employees of ICICI bank. The instrument is a self- completion questionnaire delivered to the respondents personally by the researcher.

Sources of Data collection

Primary Data Primary data was collected from the employees of ICICI.

Secondary Data The secondary data sources encompassed.

- Availableresearch work in nationaland international journals
- Dataexisting on websites
- Text books, magazines & newspapers.

Sampling Plan:

Sampling Method: Stratified sampling method and convenient sampling method were used.

Population comprised of total number of employees working in ICICI bank

Sample size :50 Employees were randomly selected from different departments and different levels of the bank using the above-mentioned methods.

Survey Instrument

The survey instrument is a questionnaire consisting of 15 items which were statements rather than questions related to employee motivation of the bank. The questionnaire consisted of dichotomous and multiple-choice questions. A five-point Likert scale was used which indicated strongly agree, agree, neutral, disagree and strongly disagree.

Participants

Respondents were the employees of the ICICI bank

7. Theoretical Framework and Review of Literature

Definition : Since an increase in productivity is the ultimate goal of every industrial organization, the motivation of employees at all levels is the most critical function of management. To motivate implies to inculcatewithin an employee a zeal and enthusiasm to produce a goal-directed behavior,where outsideinspirationis not sought after. He is driven from

forces within him and not outside. In brief, he wants to do his job.

Approaches to Motivation

A manager's style to motivation is principally determined by his assumptions about the central nature of his men. The four sets of assumptions roughly in the order of their historical appearance are:

1. Rational-economic man,
2. Social man
3. Self-actualizing man and
4. Complex man.

Incentives

Like leadership, motivation is also highly situational. Situations that hold better incentives for the worker motivate him better. A football player may play poorly for one team but much better for another. Little had changed in the player but the context in which he plays is different. Job-connected experiences of a worker play an important part in determining his motivation. Organizational structure, technological systems, physical facilities, etc., are some important components that constitute the endogenous environment of an organization and affect motivation.

MOTIVATION THEORIES

We can classify all motivation theories under three broad heads: (1) Content theories, (2) Process theories, and (3) Reinforcement theories. The content theories of motivation are those which attempt to explain what energises an individual's behaviour. They determine such needs of an individual as energise and direct his behaviour. The process theories of motivation are those which explain how behaviour is energized and directed. Reinforcement theories emphasizes the ways in which behaviour is learned shaped or modified.

Content Theories

Important content theories are:

1. Maslow's Need Hierarchy Theory,
2. Herzberg's Two-Factor Theory and
3. McClelland's Achievement Theory.

Let us consider these theories in some detail

(1) Maslow's Need Hierarchy Theory. Maslow divides all human needs into the following five categories:

Lower needs: 1. Physiological: The need for food, drink, shelter and relief from pain.

2. Safety and security: The need for freedom from threat.

Higher needs:

3.Belongingness, social activity and love: The need for friendship affiliation, interaction and love.

4. Esteem: The need for status and recognition.

5.Self-actualisation: The need to fulfil oneself by maximizing the use of abilities, skills and potential.

Maslow holds that the satisfaction of these needs has a very definite order or sequence. Lower level needs have to be satisfied before going to the higher level. Further, the needs which are satisfied do not act as active motivators, for instance, extra money will fail to motivate a man when his economic needs are adequately met.

The first two needs in the above classification are known as low order needs. The other three are called high order needs. Following table presents some important differences between these needs:

(2) Herzberg's Two-Factor Theory.

According to Herzberg following factors act as motivators:

- Achievement,
- Recognition,
- Advancement
- Work itself,
- Possibility of growth, and
- Responsibility

Factors which work as dissatisfiers are:

- Company policy and administration,
- Technical supervision,
- Inter-personal relations with supervisors, peers and subordinates,
- Salary,
- Job security,
- Personal life,
- Working conditions, and status

Review of Literature

Incentives

So far, we have learnt about motivation which is always personal and internal. Incentives are external factor which exist in the environment. Examples of incentives are pay, working conditions, fringe benefits, etc. Incentives succeed only in moving an individual, not in motivating him. We may classify incentives into:

(1) Positive and negative incentives; and

(2) Monetary and non-monetary incentives.

A positive incentive is one that attracts a person like a magnet-for example, the prospect of getting promotion, reward, fringe benefits, etc. on the other hand, a negative incentive is one that a person seeks to avoid-for example, the imposition of fine, oral or written reprimand or dismissal. In the case of positive incentive, it is the carrot

which is waived in front of the employee whereas in the case of negative incentive it is the stick which is held on his back. As Herzberg observes there is not much difference in the impact produced by these two types of incentives. The employee moves temporarily. In one case he is pulled, in the other he is pushed. In neither case a permanent movement is produced in the employee. The movement is there so long as the incentive is there. The moment the incentive is withdrawn the movement ceases. Incentives are like recharging a man's battery again and again. Like motivation, they do not provide him with his own generator.

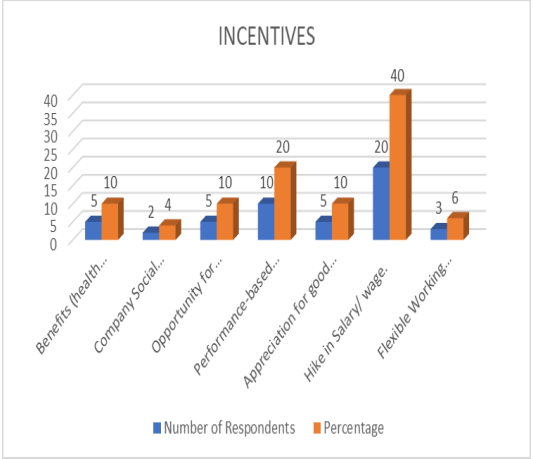
A monetary incentive relates primarily to physical need while a non-monetary incentive (competition, participation, praise and punishment, etc.,) relates to social and psychological needs. Following is a brief description of some of these incentives.

7. RESULTS AND DISCUSSION

Incentives that Motivates you the most.

Table No.1 Incentives that Motivates you the most.

SL NO	PARTICULAR	NUMBER OF RESPONDENTS	PERCENTAGE
1	Benefits (health insurance/ stock options/ vacation or sick pay).	5	10
2	Company Social Gatherings.	2	4
3	Opportunity for Promotions.	5	10
4	Performance-based Bonuses.	10	20
5	Appreciation for good work.	5	10
6	Hike in Salary/ wage.	20	40
7	Flexible Working Schedule	3	6
	Total	50	100



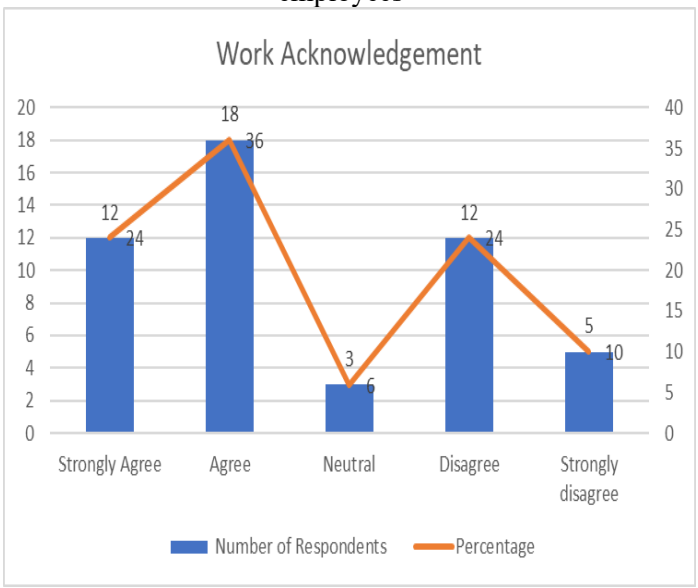
Figures No.1 Incentivesthat Motivate you the most.

Company acknowledges the work of employees

Table No.3. company acknowledging the work of employees

SL NO	PARTICULAR	NUMBER OF RESPONDENTS	PERCENTAGE
1	Strongly Agree	12	24
2	Agree	18	36
3	Neutral	3	6
4	Disagree	12	24
5	Strongly disagree	5	10
	Total	50	100

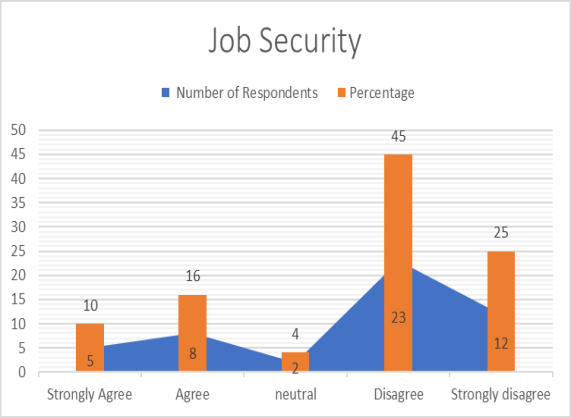
Figures No.3 company is acknowledging the work of employees



Job Security exist in the company

Table No.5 Job Security exist in the company

SL NO	PARTICULAR	NUMBER OF RESPONDENTS	PERCENTAGE
1	Strongly Agree	5	10
2	Agree	8	16
3	neutral	2	4
4	Disagree	23	45
5	Strongly disagree	12	25
	Total	50	100

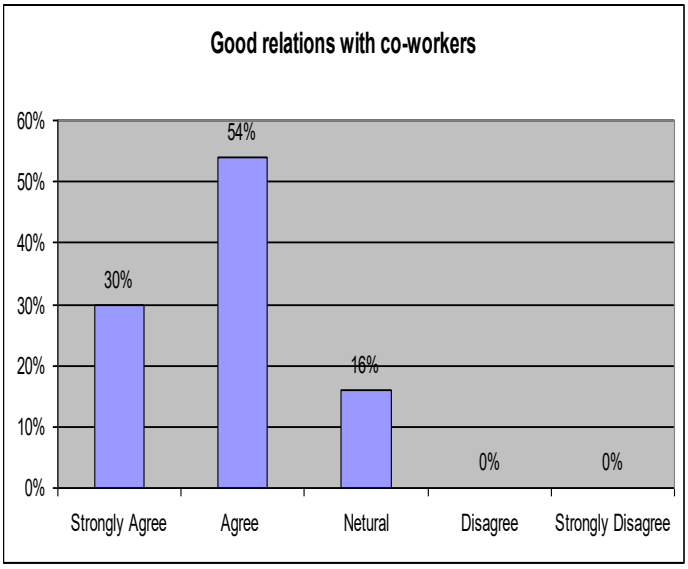


Figures No.5JobSecurity exist in the company

Good relations with co-workers exist in the company

Table No.6 Good relations with co-workers

SL NO	PARTICULAR	NUMBER OF RESPONDENTS	PERCENTAGE
1	Strongly Agree	15	30
2	Agree	27	54
3	Neutral	8	16
4	Disagree	0	0
5	Strongly disagree	0	0
	Total	50	100



Figures No. 6 Goodrelations with co-workers

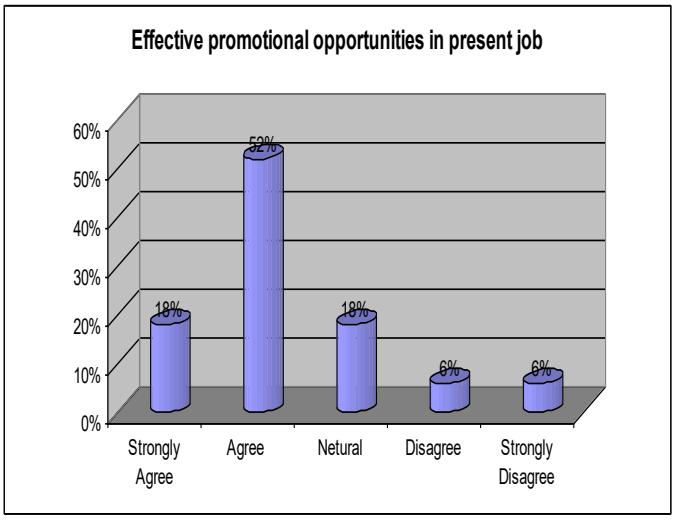
INTERPRETATION

The table shows 54% of the employees agree and 30% strongly agree that they have good relations with co-worker.

Effective promotion opportunities are present in the job

Figures No.7 Effective promotion opportunities are present in the job

SL NO	PARTICULAR	NUMBER OF RESPONDENTS	PERCENTAGE
1	Strongly Agree	9	18
2	Agree	26	52
3	Neutral	9	18
4	Disagree	3	6
5	Strongly disagree	3	6
	Total	50	100



Figures No.7 Effective promotion opportunities in present job

Findings

1. The most powerful motivating factors perceived by employees in order of preference are Hike in Salary/ wage, Performance-based bonuses, Benefits (health insurance/ stock options/ vacation or sick pay), Opportunity for promotions, Appreciation for good work, Flexible Working Schedule and Company Social Gatherings.

2. 64% of respondents opine that Management shows a genuine interest in motivating employees, whereas the remaining do not agree with this.
3. 60% of respondents feel that management acknowledges the work of employees.
4. 60% of respondents feel that Financial incentives provided by the management motivate them to do best work.
5. 26% of respondents feel that Job Security exist in the company whereas the remaining do not agree with this.
6. 84% of respondents feel that Good relations with co-workers exist in the company
7. 70% of respondents feel that Effective promotion opportunities are present in the job
8. 86% of respondents feel that Good safety measures exist in the organization.
9. 74% of respondents feel that Performance appraisal activities of the organization are helpful to get motivated.
10. 82% of respondents find that Management seems to care about employees on both professional and personal levels.
11. 72% of respondents find that Career advancement opportunities are provided by the company to get motivated.
12. 40% of respondents feel that company offers achievable long-term incentives.
13. 70% of respondents feel that Employees are respected and highly valued in my organization.
14. 50% of respondents feel that they are satisfied with the incentives company offers.
15. As it is quite apparent that there is a wide scope in improvement in matters like providing long-term incentives, ensuring Job Security, shows a genuine interest in motivating employees, acknowledges the work of employees etc.

8. CONCLUSION

Motivation remains a complex and intriguing phenomenon. as man is a complex being, he has several motives, which weave into a unique need pattern at any one time. Hence employees need to be studied and motivated separately. Motivation of an employee may change from time to time even though he may continue to behave in the same way. As per Maslow's need hierarchy theory we can say that our worker has not yet crossed the first two lower-level needs. He is still seeking satisfaction of basic physiological and security needs. Therefore, it is quite true that some of the more sophisticated and elaborate motivational devices of modern industrial management may not be appropriate here. The needs of workers may be more simply reached by direct motivational devices amended to fit the culture of their social group. Though different studies have been conducted in different industries, few studies were reported from banking industry. Hence an attempt has been made to find out major motivational factors influencing employees in ICICI bank situated at Hyderabad with the following objectives. To identify the most important factors of motivation generally perceived by employees in banking context. To study the methods of motivation practiced in the ICICI bank. To identify the level of satisfaction with respect to present incentives provided by ICICI bank. To study the perception of performance appraisal systems in ICICI bank. A Descriptive Research Design has been adopted and a Survey Method have been used.The results showed most powerful motivating factors perceived by employees in order of preference are Hike in Salary/ wage, Performance-based bonuses, Benefits (health insurance/ stock options/ vacation or sick pay), Opportunity for promotions, Appreciation for good work, Flexible Working Schedule and Company Social Gatherings. A wide scope in improvement in matters like providing long-term incentives, ensuring Job Security, shows a genuine interest in motivating employees, acknowledges the work of employees etc.

9. SUGGESTIONS

Broad Guidelines:

- Attention must first be paid to hygiene factors like salary, company policy, security, working conditions and so on. These are like diseases hence workers must first of all be made disease free before thinking of improving their health.
- Separately everypiece of work should be studied and then methods to enrich it must be found out i.e. through increasing autonomy, significance, challenge and opportunity for growth. And for this the perception of the employee matters the most, that is the workers must perceive the enrichment existing in the job.
- Employees should be informed about their motivational profile and suitable training programs and motivational development workshops should be organized to raise the motivational level of workers.
- The philosophy that 'before you motivate others you must first motivate yourself" should be adopted.
- From the findings it is quite apparent that employees perceive Salary/ wage, Performance-based bonuses, Benefits (health insurance/ stock options/ vacation or sick pay), Opportunity for promotions, Appreciation for good work, Flexible Working Schedule

as the most powerful motivating factors, hence these areas should be focused and the gap between the employees actual perception and their expectation should be overcome through effective company policies. Eventually Trust between employees and senior management must be built.

Few policies could be:

1) Justand impartial Compensation/pay
2) ConfirmingJob security
3) Civilizing and developing a constructive rapportwith immediate manager
4) Prospects to practice skills and abilities in work
5) Seek employee ideas and respect employee ideas through proper feed back system.
6) Management's recognition of employee job performance
7) Give Employees Thank You Notes
8) Offer an Employee Fun Event
9) Support in planning Employee Career Path Development
10) Calculate Hourly Rates for Bonuses
11) Conduct Quarterly Company Meet.

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IMPACT OF SELF-SERVICE TECHNOLOGIES ON CUSTOMER SATISFACTION IN SELECT PUBLIC SECTOR BANK AND PRIVATE SECTOR BANKS- A COMPARATIVE APPROACH

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ABSTRACT-Nowadays as customers no longer feel comfortable being restricted by geographical & time factors for their everyday banking transactions, the banking sector in India is exceedingly employing self-service technologies. The present study takes into account the impact of SST's with respect to Automated Teller Machine (ATM) on customer satisfaction in banking sector. Moreover, when several value-added transaction options are being offered on a continuous basis in self-service technologies, it becomes more vital to assess quality and identify valuable customer insights. This study was initiated with the purpose of studying the impact of SST with respect to ATM services on service quality and investigating the relationship between perceived dimensions of service quality and customer satisfaction of ATM services. Exploratory study was used to discover the dimensions of service quality and a series of hypotheses were presented to explain the relationship between perceived dimensions of service quality and customer satisfaction. Simple random sampling and convenience sampling methods were used. The findings detected that majority of the independent variables were positively correlated with overall satisfaction except cost, indicating customers expect that the banks should reduce its service charges and increase free transactions in ATM services. The study will add to the existing body of knowledge of the impact of technology in banking services in the aftermath of implementation of self-service technologies.

Keywords: Self-service technologies, Perceived dimensions of service quality, Customer Satisfaction, Retail banking..

1. INTRODUCTION:

Usage of ATM has been welcomed and has become remarkably commendable and popular amongst the clients. Thus, the banking sector in India is exceedingly employing Self-service Technologies (SST). The brick-and-mortar banks which are gradually transforming into digital space self-service banks are now enabling their operations using click & transact strategy using face to screen transactions. ATM users become "partial employees", thereby probably replacing the front-line employees found to be necessary during traditional method of service delivery. They can be viewed as "prosumer" technologies that allow consumers to take on the role of a producer in the economy. Banks must recognize the customers' service requirements and understand effect of service delivery performance on service quality.

2 Need for study

With the increasing usage rate of ATMs, there is a strong need for assessment of level of customer satisfaction of ATM services in both public banking sector and private banking sector on a continuous basis in India and particularly in Hyderabad. Therefore, considering all these difficulties and challenges in the background the researcher was prompted to investigate and find out the impact of ATM on service quality.

3 Statement of Problem

The research problem is "Impact of Self-Service Technologies on Customer Satisfaction in Select Public Sector Bank and Private Sector Banks- A Comparative Approach" where the dimensions of service quality and level of customer satisfaction of ATM of select SBI and ICICI were identified in the city of Hyderabad.

Research questions:

4 Research Gap:

The literature review highlights the major research area

with regard to the issues related to internet based banking in countries like Australia, U.S., United Kingdom, (Sathye,1999; Mukti,2000; Wang et al,2003; Gerrard P,Cunningham JB,2006 etc.). Dimensions of service quality in ATM and its impact on customer satisfaction were investigated in countries like Iran, Ghana, (Rahim Mosahab et al, 2010; Bedman Narteh, 2015;).

In Indian context, a lot of work has been done on the customers' satisfaction regarding branch banking services, however not many studies have been done to observe the customers' perception of satisfaction

5 Objectives:

1. To identify the dimensions of service quality of services of ATM of select banks in the city of Hyderabad.
2. To investigate the relationship between dimensions of service quality and overall customer satisfaction.
3. To compare the customer perception of service quality of ATM of select SBI bank & ICICI bank.
4. To compare the satisfaction level of customers of ATM of select SBI bank & ICICI bank.
5. To identify the hindering and facilitating factors associated with service quality of services of ATM of both SBI & ICICI.

6 Hypothesis

1. There is no correlation between dependent variable (satisfaction) and independent variables (Reliability, Accessibility, Cost, Security, Customization, Ease of use, Tangibles and Ambience).
2. Customers of SBI and ICICI bank do not differ significantly in their perception of dimensions of service quality of ATM services.
3. Customers of SBI and ICICI bank do not differ significantly in their perception about satisfaction of ATM services.

7 Limitations of the Study:

Any research work inevitably has to face several limitations; the present study is no exception to it. Following are some of the limitations encountered in the study.

1. The study relates to one particular sector only that is banking sector that too retail banking in the industry
2. The study is restricted to ATM services only other technology based self services of the banks are not studied.
3. The study was limited to the city of Hyderabad in the State of Telangana where ATM's of the two banks were prominently present. The expectations and perceptions of the customers regarding services of ATM may vary from those of the rest of India.
4. The results cannot be generalized on all categories of banks.

8 Research Methodology

Research Design:

In the beginning exploratory phase was adopted and then descriptive phase was used. In **Stage 1 -** 28 items were identified through review of literature.

Literature review included Christopher Lovelock and Evert Gummesson (2014), Mobarek. A (2017), Khan M.A (2010), Edward Marfo Yiadom et al (2012), Ameer Hasan et al (2013), Jaya Sangeetha (2012), Ziena T. Al Hakim (2012), Kumbhar Vijay (2011), and others.

This qualitative phase proposed 28 items, related to 8 factors for studying the service quality of items for ATM of SBI & the ICICI in Indian context. A test instrument that is a questionnaire was developed and to refine the questionnaire pilot study was conducted by administering the questionnaire to 36 respondents using survey method (Which included businessmen, academicians and students).

9. Reliability Analysis: In order to prove the internal reliability of items used in the survey, Cronbach's Alpha test of reliability was conducted. All the eight dimensions of services quality showed a Cronbach's Alpha coefficient of 0.865 which is more than 0.7 exhibiting internal consistency.

10. Validity Test: Content validity was tested during pilot study, and Pearson's correlation was computed to test convergent & discriminant validity. The correlation between the measures was positive 0.6 showing good convergent validity. Discriminant validity was measured by the correlation amongst similar but conceptually distinct measures.

11. Data collection: Primary data was collected from the - ATM users of the two banks namely SBI, and ICICI, residing in the city of Hyderabad.

The secondary data sources included-Published studies in different international and national journals, Information from websites such as RBI website, SBI website, ICICI Bank website, and website bank net India, and Text books.

12. Sampling Design

A simple random sampling method and convenient sampling method has been used for the study. Sampling units comprise the ATM users of the selected bank in the chosen geographical locations.

13. Sample Size:

Alreck and Settle (2004) gives a guide line which implies that for a survey research if the population is 10,000 or more a sample size between 200-1000 respondents can be considered to be adequate by most experienced researches to give reasonable results.

In this study a sample size of 200 was taken, 100 each of the two banks. Total completed responses received were 193, out of which 100 responses were received from SBI bank and 93 responses were received from ICICI bank. The responses rate was 96.5%.

Table.1.18 KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.816
Bartlett's Test of Sphericity	Approx. Chi-Square	9348.969
	Df	228
	Sig.	.000

14. Participants: Respondents were the customers of SBI and ICICI using the respective ATM's situated in the city of Hyderabad.

15. Variables in the Study:

The following Independent Variables were used in the study: Reliability, Accessibility, Security, Customization, Ease of use, Tangibility, cost and Ambience.

Dependable variables:

Customer satisfaction: - Refer to pleasures or displeasures of the perception of services performance in relation to his/her expectations.

16 Survey Instrument

This survey instrument consisted of 28 items which were statements rather than questions related to 8 proposed dimensions of service quality for customers of ATM of two banks. The instrument consisted 3 sections. Section 1 consisted of 10 background variables including demographic data of customers, section 2 presented 23 types of ATM transactions used by customers and Section 3 consisted the 28 statements along with their rating scale for assessing measurement of dimensions of services quality. A single statement for measuring overall satisfaction with services of ATM was included in the last. The questionnaire consisted of dichotomous and multiple-choice questions. A five-point Likert scale was used which indicated highly dissatisfied=1, dissatisfied=2, neither satisfied nor dissatisfied=3, satisfied=4, highly satisfied=5

17 Statistical Treatment

Means, standard deviations, frequencies, correlation coefficients and regression analysis were computed. Inferential statistics used is Independent samples t test for analyzing the data.

18 Conceptual frame work

Customer satisfaction

According to Schiffman and Kanuk (2004) Customer satisfaction is defined as "the individual's perception of the performance of the products or services in relation to his or her expectations". Oliver, Richard L (1997) defined "satisfaction/dissatisfaction as the consumer's fulfillment response, the degree to which the level of fulfillment is pleasant or unpleasant". It involves "an evaluative, affective, or emotional response" & is "the ability to meet customers' expectations.

Customer satisfaction "is a general attitude relating to a service company" or "an emotional response to the difference between what clients expect and what they receive". Rolph E.A & Srini S.S (2003) defined "customer satisfaction as the contentment of the customer relating to his or her prior purchasing experience with a given service firm. It is a conclusion that a service or product provides an enjoyable level of consumption-related fulfillment".

2. RESULTS AND DISCUSSION

Frequencies of ATM transactions

The respondents were asked to indicate with a yes/no option for all those service transactions which are being used through ATM.

Table 4.3 showing frequency of service transactions done by ATM users

Sl. No.	Transactions	Response	Frequency	Percentage
1.	Cash withdrawal	Yes	193	100
		No	Nil	Nil
2	Balance Enquiry	Yes	189	98
		No	4	02
3	Pin change	Yes	189	98
		No	4	02

4	Mini statement	Yes	189	98
		No	4	02
5	Funds transfer (transfer between linked account, card to card transfer)	Yes	118	61
		No	75	39
6	Credit card (visa) bill payment	Yes	46	24
		No	147	76
7	Mobile recharge	Yes	46	24
		No	147	76
8	Cash deposit	Yes	118	61
		No	75	39
9	Cheque deposit	Yes	81	42
		No	102	58
10	Air ticketing of kingfisher airlines only	Yes	4	02
		No	189	98
11	Register mobile number	Yes	81	42
		No	102	58
12	Loan account enquiry	Yes	4	02
		No	189	98
13	Open fixed deposit	Yes	4	02
		No	189	98
14	Ultra fast cash	Yes	189	98
		No	4	02
15	Cheque book request	Yes	81	42
		No	102	58
16	Credit card loan payment	Yes	4	02
		No	189	98
17	Pay ICICI prudential life insurance premium	Yes	4	02
		No	189	98
18	SBI life premium payment	Yes	4	02
		No	189	98
19	Mutual fund payment	Yes	4	02
		No	189	98
20	Trust donations	Yes	46	24
		No	147	76
21	Cash advances/withdrawals	Yes	81	42
		No	102	58
22	Free sms alert registrations	Yes	81	42
		No	102	58
23	Mobile banking registration	Yes	118	61
		No	75	39

Correlation between independent variables & perceived overall customer satisfaction

Table: 4.5a Correlations between independent variables & perceived customer satisfaction

		Reliability	**Accessibility**	**Cost**	**Security**	**Customization**	**Ease of use**	**Tangibility**	**Ambience**	**Overall satisfaction**

1	Reliability	Pearson Correlation	1	.285**	-.133**	.675**	.493**	.431**	.507**	.281**	.620**
		Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
2	Accessibility	Pearson Correlation	.285**	1	.564**	.280**	.495**	.402**	.590	.426**	.423
		Sig. (2-tailed)	.000		.000	.000	.000	.004	.414	.000	.509
		N	193	193	193	193	193	193	193	193	193
3	Cost	Pearson Correlation	-.133**	.564**	1	.098**	.116**	.184**	.068	-.210**	-.156**
		Sig. (2-tailed)	.000	.000		.006	.001	.000	.054	.000	.000
		N	193	193	193	193	193	193	193	193	193
4	Security	Pearson Correlation	.675**	.280**	.098**	1	.503**	.383**	.582**	.474**	.731**
		Sig. (2-tailed)	.000	.000	.006		.000	.000	.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
5	Customization	Pearson Correlation	.493**	.495**	.116**	.503**	1	.663**	.487**	.423**	.602**
		Sig. (2-tailed)	.000	.000	.001	.000		.000	.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
6	Ease of use	Pearson Correlation	.431**	.402**	.184**	.383**	.663**	1	.430**	.326**	.521**
		Sig. (2-tailed)	.000	.004	.000	.000	.000		.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
7	Tangibility	Pearson Correlation	.507**	.590	.068	.582**	.487**	.430**	1	.390**	.362**
		Sig. (2-tailed)	.000	.414	.054	.000	.000	.000		.000	.000
		N	193	193	193	193	193	193	193	193	193
8	Ambience	Pearson Correlation	.281**	.426**	-.210**	.474**	.423**	.326**	.390**	1	.337**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000
		N	193	193	193	193	193	193	193	193	193
9	Overall satisfaction	Pearson Correlation	.620**	.423	-.156**	.731**	.602**	.521**	.362**	.337**	1
		Sig. (2-tailed)	.000	.509	.000	.000	.000	.000	.000	.000	
		N	193	193	193	193	193	193	193	193	193
	**. Correlation is significant at the 0.01 level (2-tailed).										

Table 4.8b– Independent sample t test of dimensions of service-quality of ATM of SBI& ICICI

Independent Samples Test									
		Levene's Test for Equality of Variances		**t-test for Equality of Means**					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Decision
Reliability	Equal variances assumed	12.354	.000	-9.698	801	**.000**	-2.15956	.22265	Reject Null
	Equal variances not assumed			-9.672	754.033	**.000**	-2.15536	.22525	
Accessibility	Equal variances assumed	2.255	.134	-1.524	800	.128	-.28394	.18635	Accept Null

	Equal variances not assumed			-1.521	789.273	.129	-.28594	.18656	
Cost	Equal variances assumed	15.956	.000	.664	801	.507	.14748	.22219	Accept Null
	Equal variances not assumed			.666	799.276	.505	.14748	.22135	
Security	Equal variances assumed	17.857	.000	-9.281	801	**.000**	-1.94622	.20971	Reject Null
	Equal variances not assumed			-9.232	763.203	**.000**	-1.94622	.21081	
Customization	Equal variances assumed	13.750	.000	-5.025	801	**.000**	-.19378	.15995	Reject Null
	Equal variances not assumed			-5.000	765.623	**.000**	-.19378	.16075	
Ease of use	Equal variances assumed	4.352	.038	-1.689	801	.092	-.39398	.23320	Accept Null
	Equal variances not assumed			-1.685	785.396	.092	-.39398	.23378	
Tangibility	Equal variances assumed	73.159	.000	-5.115	801	**.000**	-.79021	.15288	Reject Null
	Equal variances not assumed			-5.053	679.160	**.000**	-.79021	.15637	
Ambience	Equal variances assumed	19.925	.000	-6.947	801	**.000**	-1.80879	.26036	Reject Null
	Equal variances not assumed			-6.907	757.866	**.000**	-1.80879	.26188	

Table 4.9a Mean of Customer overall Satisfaction of services of ATM of SBI& ICICI

	Bank	N	Mean	Std. Deviation	Std. Error Mean
Customer Overall Satisfaction	SBI.	100	1.6920	.56221	.02794
	ICICI.	93	1.9129	.66396	.03367

Table 4.9b Independent Samples t test for Comparison of perception of customer satisfaction of services of ATM between the SBI & ICICI.

Independent Samples Test										
		Levene's Test for Equality of Variances		**t-test for Equality of Means**						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Customer Satisfaction	**Equal variances assumed**	.290	.591	5.077	801	.000	.22077	.04353	.13253	.30242

	Equal variances not assumed			5.051	764.627	.000	.22067	.04325	.13529	.30626

It is apparent from the given table that the mean of ICICI is more than the mean of SBI indicating that the ATM customers of ICICI are more satisfied than the ATM customers of SBI. The result of the t test exhibit that there is significant difference in customer satisfaction of Service of ATM provided by SBI & ICICI. Table No. 4.9b point outs that there is significant difference ($T = 5.077$, $df = 801$; $P < 5$ ($P = 0.000$) in the perception of customer satisfaction of ATM services provided by public & ICICI hence it leads to rejection of null hypothesis.

3. CONCLUSION:

The Service sector in India is witnessing a self-service revolution, where technology enabled self services are taking over the role of front-line employees in different sectors of services. Self-check in, self-check out, internet shopping, online banking, different applications on android phones are few of the self-services pervading the market. Research on different self services technologies are still in its infant stage. Though ATMs in banking sector have grown at an exponential rate with almost 2 Lakh ATMs catering to the needs of the customers, throughout the country, many value-added functions have been added in the ATM Services.

It was detected that majority of the independent variables were positively correlated with overall satisfaction except cost, indicating customers expect that the banks should reduce its service charges & increase free transactions in ATM services. When the service-quality & customer satisfaction of ATMs of the SBI& the ICICI were compared it was seen that the customer satisfaction & service-quality of the ICICI ATMs were being perceived better than the services of ATM of SBI. The differences are quite visible relating to Ambience, tangibility, security, customization & reliability of ATMs far better than SBI bank ATMs.

4. SUGGESTIONS & RECOMMENDATIONS:

Banks should put up attractive posters with easily understandable animated illustrations inside the ATM premises showing ways to operate all the services of ATM. & if possible, handouts of the same posters should be kept available for the customers to carry with them for easy reference. These measures may help the customers to comprehend & practice the services by themselves, particularly those services which are not in vogue. An alternative measure could be to make available a technician or security personal cum technician at the ATM who will support the customers in using value added new services of ATM. But in reality, majority of ATM of both SBI& ICICI, does not have a proper alert security person available 24X7 hrs.

Next the banks should come up with some incentives or rewards for those customers who are actively involved in learning all the services efficiently & undertaking maximum utilization of ATM in a productive manner. This could be materialized through monetary savings, psychological benefits, physical benefits, greater access to the bank in terms of both location & time etc.

Lastly if the banks fail to train & educate the customers in using ATM services, & customer fail in service generation, this will negatively affect their own service outcome as well as other customers' outcome, lowering both quality & productivity of service. Whatsoever be the quality of technology be used by the banks, unless the customers is well trained with the usage of technology, the benefits of SST cannot be derived.

Future Research

1. Future research may attempt to conduct a similar study for the ATMs installed at rural areas or remote place of urban areas with requisite modifications.
2. In future a researcher can investigate the congruence between customers & service providers' perception relating to the service-quality of ATMs. Identifying of the differences in perception will help the banks to overcome the differences so as to increase service-quality & satisfaction.
3. Future research may attempt to explore the unexplained constructs that the banks are installing in their ATMs. ICICI Bank ATMs promote their ATMs as similar to branch banking, by including many more value-added transactions in ATMs. Research may be conducted relating to adoption, attitude survey, perception of service quality, satisfaction etc., relating to the newly introduced value-added services of ATM.
4. Future research may attempt to study the perception of mobile ATMs & solar ATM relating to their adoption, preference, quality & satisfaction.
5. Future research may attempt to study the employees' attitude towards the failure of ATM transactions.
6. Future research should be conducted to determine the factors that contribute to the differences in customers' service-quality & satisfaction between cities & remote places.

7. Coverage of a wider geographical area or the whole state also can be considered for future study so as to increase the generalization of the finding of service quality, satisfaction, customer retention & loyalty relating to retail banking & electronic banking.
8. The methods & dimension can be replicated in other service industry in the country or outside the country or in a different industry where similar SST or kiosks are being used.
9. With minor changes & modification the method & measurement can be applied to other self-service techniques prevalent in communication sector, transportation sector & in applications of social media etc.

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A COMPARATIVE STUDY TO ASSESS SERVICE QUALITY AND CUSTOMER SATISFACTION OF ATM SERVICES IN SELECT PUBLIC SECTOR AND PRIVATE SECTOR BANKS

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ABSTRACT-Self Service Technologies (SSTs) offer value to customers providing them with anytime, anywhere and anyway banking and are slowly replacing many face to face service interactions and represent the ultimate form of customer participation enabling convenient, accurate and faster transactions. The present study takes into account the impact of Automated Teller Machine (ATM) on service quality in banking sector and investigate the relationship between perceived dimensions of service quality and customer satisfaction of ATM services among the customers of two banks namely Andhra bank and Axis bank in the city of Hyderabad. Modified SERVQUAL tool was used to measure service quality of ATM services of the banks. The findings detected that majority of the independent variables were positively correlated with overall satisfaction except cost, indicating customers expect that the banks should reduce its service charges and increase free transactions in ATM services. It was seen that the customer satisfaction & service quality of the private sector banks ATMs were being perceived better than the services of ATM of public sector banks. Thus, the study will contribute to understand customer insights better, which may help banks to understand customer expectations more precisely. An important outcome of this research is a new tool to measure service quality of ATM services in city of Hyderabad.
Keywords: Self-service Technologies, ATM services, Dimensions of service quality, Customer Satisfaction and Retail Banking.

1. INTRODUCTION:

Banks have been competing not only to expand their clientele base but also to retain the existing customer base. Under such changing circumstances the service offerings have become much more customer centric and customer specific than ever before. Thus, all banks in the post-liberalization era have recognized that excellent services have to be provided to their customers and for this reason they need to adopt the latest technology. Online banking or e-banking provides various e-delivery channels some of which are self-service based for using banking services like debit cards, ATMs, internet banking, credit cards, electronic fund transfer (EFT), mobile banking and electronic clearing system etc. But ATM is acknowledged as the most recognized electronic delivery channel than any other e-channels.

2 Need for study

Despite of all the benefits enjoyed through the ATMs, customers time and again complain of many persistent shortfalls such as; machines are being temporary out of service, unavailability of cash, ATM card getting stuck up, queues at Service of ATM points, ineffective recovery from faults and of foremost importance are financial and personal security. Such problems are affecting the consistency in service quality of ATM. Therefore, considering all these difficulties and challenges in the background the researcher was prompted to investigate and find out the impact of SST (ATM) on service quality.

3 Statement of Problem

The research problem is "A comparative study to assess service quality and customer satisfaction of ATM services in select public sector and private sector banks" where the dimensions of service quality of ATM of select banks were identified in the city of Hyderabad.

4 Research Gap:

The literature review highlights the major research area with regard to the issues related to internet based banking in countries like Malaysia, Finland (Wang et al,2013; Gerrard P,Cunningham JB,2011 etc.). Dimensions of service quality in ATM and its impact on customer satisfaction were investigated in countries like Malawi and Pakistan (Bedman Narteh, 2015; Khan, 2010). Other published research studies carried out in

India addressed the factors relating to adoption of any one of the technology-enabled banking self-services which includes ATM or net banking (P.Malhotra and B.Singh, 2010; Geetika et. al., 2008, Mukherjee and Nath, 2005).

5 Objectives:

6. To identify the dimensions of service quality of services of ATM of select banks in the city of Hyderabad.
7. To investigate the relationship between dimensions of service quality and overall customer satisfaction.
8. To compare the customer perception of service quality of SST vis-à-vis ATM of select public sector banks & private sector banks.
9. To compare the satisfaction level of customers of SST vis-à-vis ATM of select public sector banks & private sector banks.
10. To identify the hindering and facilitating factors associated with service quality of services of ATM of both public sector & private sector banks.

6. Hypothesis:

4. There is no correlation between dependent variable (satisfaction) and independent variables (Reliability, Accessibility, Cost, Security, Customization, Ease of use, Tangibles and Ambience).
5. Customers of Andhra bank and Axis bank do not differ significantly in their perception of dimensions of service quality of ATM services.
6. Customers of Andhra bank and Axis bank do not differ significantly in their perception about satisfaction of ATM services.

7. Limitations of the Study:

1. The findings cannot be generalized for the whole population.
2. Many customers still remain illiterate regarding latest value-added technology being adopted in retail banking and carry apprehension and to some extent hesitation in using such technologies, hence may express inaccurate perception towards the services.
3. There are chances that the people may not deliberately report their true opinion owing to some bias.
4. The secondary data collected for this study may also carry limitations inherent in it indicating that accuracy of results of this study depends on the accuracy of data collected from both primary and secondary sources.

8. Research Methodology:

In the beginning exploratory phase was adopted and then descriptive phase was used. In **Stage 1 -** 28 items were identified through review of literature.

Literature review included Vimpla Virparia (2013), Haruna Issahaku (2013), Charles Mwatsika (2014), Bedman Narteh (2013), Pahwa Manvinder Singh (2010), Daniel Onwonga Auka (2013), and Mary Loonam, Deirdre O'Loughlin (2008),. This qualitative phase proposed 28 items, related to 8 factors for studying the service quality of items for ATM. A test instrument that is a questionnaire was developed and to refine the questionnaire pilot study was conducted by administering the questionnaire to 36 respondents using survey method (Which included businessmen, academicians and students).

9. Reliability Analysis: In order to prove the internal reliability of items used in the survey, Cronbach's Alpha test of reliability was conducted. All the eight dimensions of services quality showed a Cronbach's Alpha coefficient of more than 0.7 exhibiting internal consistency.

10. Validity Test: Content validity was tested during pilot study, and Pearson's correlation was computed to test convergent & discriminant validity. The correlation between the measures was positive 0.6 showing good convergent validity. Discriminant validity was measured by the correlation amongst similar but conceptually distinct measures.

11. Data collection: Primary data was collected from the - ATM users of the two banks namely Andhra Bank, and Axis Bank, residing in the city of Hyderabad.

The secondary data sources included-Published studies in different international and national journals, Information from websites such as RBI website, Andhra Bank website, Axis Bank website, and website bank net India, and Text books.

12. Sampling Design

A simple random sampling method and convenient sampling method has been used for the study. Sampling units comprise the ATM users of the selected bank in the chosen geographical locations.

13. Sample Size: In this study a sample size of 200 was taken, 100 each of the two banks. Total completed responses received were 193, out of which 100 responses were received from Andhra Bank and 93 responses were received from AXIS Bank. The responses rate was 97%.

The Kaiser Meyer-Olkin (KMO) measure of sample adequacy yielded 0.811 considered to be good by Kaiser refer table.1.1

Table.1.1 KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.811
Bartlett's Test of Sphericity	Approx. Chi-Square	9348.969
	Df	178
	Sig.	.000

14. Participants

Respondents were the customers of ANDHRA BANK and AXIS BANK using the respective ATMs situated in the city of Hyderabad.

15. Variables in the Study:

The following Independent Variables were used in the study: Reliability, Accessibility, Security, Customization, Ease of use, Tangibility, Cost and Ambience.

16. Dependable variables: Customer satisfaction

17. Survey Instrument

In this study SERVQUAL was modified to suit the judgment of service quality of self-service technologies used in banking sector with reference to ATM.

18. Statistical Treatment

Means, standard deviations, frequencies, and correlation coefficients were computed. Inferential statistics used is Independent samples t test for analyzing the data.

19. Review of Literature- Conceptual frame work

Customer satisfaction: Tse, D., & Wilton, P, (1988) defines customer satisfaction as "the consumer's response to the evaluation of the perceived discrepancy between prior expectancies and the real overall performance of the services or products as perceived after its consumption, for this reason satisfaction is considered for common post-purchase assessment by the customer".

Fornell C, (1992) opines that as such there is no universal definition of customer satisfaction, but attempts to define it as "customer satisfaction is identified by a response (cognitive or affective) that pertains to a particular focus (i.e. a purchase experience and/or the associated product) and occurs at a certain time (i.e.post-purchase, post-consumption)". Giese, Joan L. and Joseph A. Cote, (2000) says that "customer's degree of satisfaction is found by his collective experience at the moment of contact with the dealer". Measuring customer satisfaction can be very difficult in some instances due to the fact it is an attempt to assess human emotions". It was because of this reason that a few researchers offered that "the simplest manner to understand how customers experience, and what they need is to ask them" this relates to the informal measures.

Service quality: Service quality as perceived by customer has been theoretically termed as the variation amid prior service expectations and the actual service perceived (Steven P.Brown & Lam, 2008). This is very close to Michael D.Johnson Claes Fornell (1992) definition that "customer satisfaction is expressed as a function of pre-purchase expectations and post purchase perceived performance (of the respective product/service)", & expectations possibly as a result of advertisement and/or other word-of-mouth customers' recommendations. A distinction must be made between "expectations" as mentioned in literature of service quality & that in the literature of customer satisfaction. Parasuraman et al. (1988) opines that expectations, which is used in literature of customer satisfaction, implies the "predictions" made by customers which might occur during a service transaction; according to Richard L. Oliver (1981), "it is normally agreed that expectancies are consumer-defined chances of the prevalence of positive and negative occasions if the consumer engages in some conduct". Whilst in service quality literature, expectations relate to desires of consumers and their feelings about what is being offered.

2. REVIEW OF LITERATURE

Banknet Publications (2017) report is based on ATM user's perceptions towards adopting the ATM machines, value added services provided by the ATM & the problems faced by customers belonging to Andhra Pradesh, Karnataka, Delhi, Tamil Nadu & Maharashtra. The key findings of this study are increase in the monthly usage of ATM is due to the multiplicity of services banks are offering & examples of usage of the value-added services are mutual fund transactions, bill payment, pre-paid mobile recharges & booking airline/rail tickets. Waiting in long queues & faster cash depletion at high-demand areas are the problems identified hence the need of additional machines to be installed. Most of the research was done mainly on 3 different areas: online service quality, online retailing service quality & web site design quality & there has been inadequate attention to other service contexts. In reality both online retailing quality & web site design quality are important components of online service quality.

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21. Data Analysis & Interpretation

22. Correlation between independent variables & perceived overall customer satisfaction

Table: 1.3 Correlations between independent variables & perceived customer satisfaction

			Reliability	Accessibility	Cost	Security	Customization	Ease of use	Tangibility	Ambience	Overall satisfaction
1	Reliability	Pearson Correlation	1	.285**	-.133**	.675**	.493**	.431**	.507**	.281**	.620**
		Sig. (2-tailed)		.000	.000	.000	.000	.000	.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
2	Accessibility	Pearson Correlation	.285**	1	.564**	.280**	.495**	.402**	.590	.426**	.423
		Sig. (2-tailed)	.000		.000	.000	.000	.004	.414	.000	.509
		N	193	193	193	193	193	193	193	193	193
3	Cost	Pearson Correlation	-.133**	.564**	1	.098**	.116**	.184**	.068	-.210**	-.156**
		Sig. (2-tailed)	.000	.000		.006	.001	.000	.054	.000	.000
		N	193	193	193	193	193	193	193	193	193
4	Security	Pearson Correlation	.675**	.280**	.098**	1	.503**	.383**	.582**	.474**	.731**
		Sig. (2-tailed)	.000	.000	.006		.000	.000	.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
5	Customization	Pearson Correlation	.493**	.495**	.116**	.503**	1	.663**	.487**	.423**	.602**
		Sig. (2-tailed)	.000	.000	.001	.000		.000	.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
6	Ease of use	Pearson Correlation	.431**	.402**	.184**	.383**	.663**	1	.430**	.326**	.521**
		Sig. (2-tailed)	.000	.004	.000	.000	.000		.000	.000	.000
		N	193	193	193	193	193	193	193	193	193
7	Tangibility	Pearson Correlation	.507**	.590	.068	.582**	.487**	.430**	1	.390**	.362**
		Sig. (2-tailed)	.000	.414	.054	.000	.000	.000		.000	.000
		N	193	193	193	193	193	193	193	193	193
8	Ambience	Pearson Correlation	.281**	.426**	-.210**	.474**	.423**	.326**	.390**	1	.337**
		Sig. (2-tailed)	.000	.000	.000	.000	.000	.000	.000		.000
		N	193	193	193	193	193	193	193	193	193
9	Overall satisfaction	Pearson Correlation	.620**	.423	-.156**	.731**	.602**	.521**	.362**	.337**	1
		Sig. (2-tailed)	.000	.509	.000	.000	.000	.000	.000	.000	
		N	193	193	193	193	193	193	193	193	193
	**. Correlation is significant at the 0.01 level (2-tailed).										

It is evident from the table that all the variables except cost are positively correlated with each other indicating that the independent variables are influencing others in positive direction and are statistically significant. Cost shows a significant negative correlation with reliability, ambience and customer satisfaction. The results show that there is positive and significant correlation between perceived customer satisfaction and the independent variables–where Security yielded a correlation coefficient (r= 0.731, p= .000) followed by Reliability

(r= 0.620, p= .000), Customization (r= 0.602, p= .000), Ease of use (r= 0.521, p= .000), Accessibility (r= 0.423, p= .509), Tangibility (r= 0.362, p= .000) and Ambience (r= 0.337, p= .000). Whereas a negative correlation is found with Cost (r= -0.156, p= .000) and is found to be significant. Tangibility is correlated with accessibility and Cost insignificantly. The above findings indicate that with the improvement of dimensions of independent variables, there will be a significant improvement in customer satisfaction. Where as in case of Cost, less the cost associated while using services of ATM more will be customer satisfaction, reliability and ambience. Hence it is evident from the results arrived at, that null hypothesis which is presented in the beginning is unacceptable.

23. Comparison of perception of dimensions of service-quality of ATM of Andhra Bank & Axis Bank.

Table 1.4– Independent sample t test of dimensions of service-quality of ATM of ANDHRA BANK & AXIS BANK

Independent Samples Test									
		Levene's Test for Equality of Variances		**t-test for Equality of Means**					
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	Decision
Reliability	Equal variances assumed	12.364	.000	-9.698	801	**.000**	-2.15936	.22265	Reject Null
	Equal variances not-assumed			-9.672	784.033	**.000**	-2.15936	.22325	
Accessibility	Equal variances assumed	2.256	.134	-1.524	800	.128	-.28394	.18635	Accept Null
	Equal variances not-assumed			-1.521	789.273	.129	-.28394	.18666	
Cost	Equal variances assumed	15.926	.000	.664	801	.507	.14748	.22219	Accept Null
	Equal variances not-assumed			.666	799.276	.505	.14748	.22135	
Security	Equal variances assumed	17.897	.000	-9.281	801	**.000**	-1.94622	.20971	Reject Null
	Equal variances not-assumed			-9.232	763.203	**.000**	-1.94622	.21081	
Customization	Equal variances assumed	13.780	.000	-5.025	801	**.000**	-.19378	.15995	Reject Null
	Equal variances not assumed			-5.000	765.623	**.000**	-.19378	.16075	
Ease of use	Equal variances assumed	4.322	.038	-1.689	801	.092	-.39398	.23320	Accept Null
	Equal variances not assumed			-1.685	785.396	.092	-.39398	.23378	
Tangibility	Equal variances assumed	73.149	.000	-5.115	801	**.000**	-.79021	.15288	Reject Null
	Equal variances not assumed			-5.053	679.160	**.000**	-.79021	.15637	
Ambience	Equal variances assumed	19.928	.000	-6.947	801	**.000**	-1.80879	.26036	Reject Null
	Equal variances not assumed			-6.907	757.866	**.000**	-1.80879	.26188	

As per the values presented in table the result of the t test for individual quality dimensions shows that there is significant difference amongst the customers with respect to the Reliability, Security, Customization, Tangibility and Ambience service quality dimensions of services of ATM provided by both the banks. Whereas

there is no significant difference is found in the remaining dimensions of service quality, which are Accessibility, Ease of use and Cost as P > 5. Thus, it is clear that null hypothesis is not accepted in case of five out of eight dimensions of service quality pertaining to ATMs.

24. Comparison of perception of customer satisfaction of services of ATM of Andhra Bank & Axis bank.

Table 1.5 Mean of Customer overall Satisfaction of services of ATM of Andhra Bank& AXIS Bank

	Bank	N	Mean	Std. Deviation	Std. Error Mean
Customer Overall Satisfaction	ANDHRA BANK.	100	1.6910	.56911	.02792
	AXIS BANK.	93	1.9119	.66311	.03327

Table 1.6 Independent Samples t test for Comparison of perception of customer satisfaction of services of ATM between the Andhra Bank & Axis Bank.

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Customer Satisfaction	**Equal variances assumed**	.291	.591	5.077	801	.000	.22117	.04353	.13513	.30612
	Equal variances not assumed			5.051	764.617	.000	.22017	.04375	.13519	.30186

It is apparent from the given table that the mean of private sector banks is more than the mean of public sector banks indicating that the ATM customers of private sector banks are more satisfied than the ATM customers of public sector banks. The result of the t test exhibit that there is significant difference in customer satisfaction of Service of ATM provided by public sector and private sector banks. Table No. 1.7 point outs that there is significant difference (T = 5.077, df = 801; P < 5 (P = 0.000) in the perception of customer satisfaction of ATM services provided by public and private sector banks hence it leads to rejection of null hypothesis.

25. Results and Discussion

Review of literature helped in identifying & percolation of items related to different service quality dimensions. After analyzing many studies as cited in review of literature regarding the dimensions of service quality of ATM, eight factors encompassing 28 items were identified. The dimensions are Reliability, Accessibility, Security, Customization, Ease of use, Tangibility, Cost & Ambience. These dimensions of service quality of ATM are unique for studying service quality of items for ATM of both the types of banks in Indian context, in particular in the culture prevailing in the city of Hyderabad. Reliability testing of the scales using Cronbach's alpha coefficient" was done & each of the eight scales used in the questionnaire– Reliability, Accessibility, Security, Cost, Customization, Ease of use, Tangibility, Ambience showed a Cronbach's Alpha coefficient of more than 0.7 exhibiting internal consistency.

It is apparent from the discussion previously done that all the independent variables except cost are positively correlated with customer satisfaction indicating that with the improvement of the dimension of independent variables & decrease in the cost associated with the services, there will be significant improvement in customer satisfaction. Further it was observed that security, reliability, accessibility amongst other proved to be strong predicators of customer satisfaction. As customers, particularly female customers who are more vulnerable to attacks have a high concern towards physical & financial security, hence the correlation of

security & customer satisfaction is positive & security is a strong predicator of customer satisfaction.

As discussed previously the customers of ATMs of public sector banks & private sector banks, differ significantly in perceiving dimensions of service quality relating to ATM services. It is observed that the perception of reliability, customization, security, tangibility & ambience of private sector bank ATMs was better than that of public sector bank ATMs.

The variation could be due to the fact that Axis Bank ATMs are maintaining better quality of tangibles & ambience than public sector bank ATMs. Interior design of ATM services, layout design, 24x7 Air conditioning services, cleanliness, striking colors in the booth are the several factors which are able to impress the customers more than other banks. Moreover, private sector banks, considering the ever-increasing competition, have made optimum use of technology to Standardize their services. Moreover, more value-added services are being added into the services of ATM of the private sector banks & are able to gratify a wider range of needs of the customers.

It was found that customers of private sector banks ATMs are more satisfied than the customers of public sector bank ATMs. The possible reasons could be that the dimension of service quality like reliability, customization, security, tangibles & ambience which are perceived better in case of private sector bank ATMs are found to be positively correlated with overall satisfaction. Hence the satisfaction of private sector bank ATMs is found to be better than public sector bank ATMs. Reliability being the most important intrinsic satisfier of the ATM services is better in case of private sector banks & is primarily responsible for better overall satisfaction of services of ATM other factors which resemble hygiene factors provide additional advantage in increasing customers satisfaction. Private sector bank ATMs maintain a good quality of interior decoration, 24x7 hr Air conditioning, cleanliness, modern machines, good layout design & effective cash replenishment practices. All these are the possible reasons for the variations in satisfaction between the services of ATM of Private Sector bank & public sector banks.

Service encounters play a critical role in building a good perception of the service quality amongst the customers. Customers develop certain expectation levels before approaching the service of ATM of any bank. The First & foremost encounter is the easy access, the customer is expecting from the service. If the banks are able to provide convenient spots or places of ATM transactions which are situated at strategic places, where usually a customer develops a need for hard cash & his need is fulfilled, goes a long way in facilitating the customers. More over if the ATM booth is well lit & visible to all, facilitates the customers where as in contrast to this if easy access to ATM is not available either due its low coverage or difficult & remote address, the customer is dissatisfied. Isolated dark places where ATMs are situated hinders the customers to reach the place, particularly the problem is felt by female customer. Customers expect 100% physical & financial security while transacting in an ATM. If security guard is available 24x7 hrs, doors of ATM booth are secure & lock properly & there is no fear of shoulder surfing, spying or exhibition of threatening behavior by co-customers during an ATM transaction makes a customer feel secure & in contrast to this, hindering factors may be absence of security guard, no proper locking system of doors & financial transactional errors etc. Next when the customer enters the ATM booth, proper functional Air conditioning, fresh Air, good smell, light music, waiting place with seating arrangement, clean & tidy place, proper layout design where there is comfortable space between machines, for the customers to move around without disturbing other customers, water dispenser & attractive tangibles like modern machines, posters, suggestion box, dust bin etc., will act as facilitating factor for ATM Services. Failure to provide many of these facilities will definitely hinder the services of ATM in perceiving customers.

Finally, the most important, central factor affecting the perception of customers is reliability of ATM services. Customer becomes happy if the purpose of transaction in ATM is accomplished. 24x7 hrs cash availability is facilitating factor & if some good guidance is given to customers to perform other various value-added service effectively the customer will be delighted. If the transactions of ATM are error less, facilitates the customer & the other way around every error will be hindering the perception of customers. If every promise made by banks is fulfilled, this helps in developing a good perception of service quality & satisfaction amongst the customers. If the situation takes a wrong turn, hinders the development of good service in ATMs of respective banks.

3. CONCLUSION:

Research works have been done in few cities of India regarding customer satisfaction of services of ATM but with the new value-added services further in-depth research was called for in ATM Services. Moreover, never ending problems of services of ATM with which customers have become fed up have acted as stimulus to

conduct an in-depth research on service quality & customer satisfaction of services of ATM of banks namely Andhra Bank & Axis Bank. The public sector bank ATMs need to upgrade their technology of ATMs, improve maintenance of ATMs, monitor their cash replenishment policies, enhance their aesthetic value of the environment of the ATM booth & customize the services according to the desired level of service expectation of customers. Private sector bank ATMs should focus on improving accessibility of ATMs for the customers. Cost factor remains the pinching issue for the customers of both the category of bank ATMs.

4. SUGGESTIONS & RECOMMENDATIONS:

1. Bank should install some form of "Alert Button" "Panic Button" or "silent alarm" or other such device that customers can use in times of emergencies like kidnapping & forced withdrawal of money from ATM.
2. Bank should ensure that the doors of ATM booth should be strong & should lock from inside when a customer is withdrawing money. Usually, the process of swiping the ATM card to enter the booth is non-functioning & the door does not lock properly once the customer enters the booth
3. In case of situation when security of women, old age people & dependents is at stake, bank can provide such facilities where ATM are exclusive for such segments of customers & any incompatibility amongst customers can be easily overcomed. Banks ATM's can be positioned to communicate the message of exclusive ATMs to the market place so that customers can self-select ATM of choice.
4. Though the bank has installed CCTV cameras in every ATM, it should ensure its proper functioning periodically & preferably all the CCTV cameras installed must be monitored from a monitoring center, created & maintained efficiently in every bank. Fake keypads, fake ATMs, cards copying devices (skimmers), Pin stealing devices like extra cameras, robberies, breaking the machine or any such incidents can be monitored & checked by using actively monitored CCTVs. Many such devices are disguised to look like a part of the machine & a customer can be duped easily. Skimmers easily clone the ATM Cards & hidden cameras can steal pin members to be used to draw the customers' money.
5. Mobile ATMs should be set up at airports, railway station, bus station, entertainment venues & even at disaster sites, so that the problem of accessibility is easily solved.
6. Banks should ensure such stringent & fool proof design of ATM Machine & its environment that any devices installed by fraudsters can be easily detected.

Thus, the model puts across an apparent message to manager's who are yearning to improve service quality that the solution to close the customer gap is to close the provider Gap – 1, 2, 3 & 4 & keep them closed.

5. FUTURE RESEARCH

1. Future research should concentrate on new & developing geographical areas, different sample size & all types of retail banks including foreign banks.
2. Further research is required to scrutinize the differences in the perception related to service quality amongst more relevant & important group such as minorities & migrants.
3. Further research is desirable to study the heterogeneity of the customer satisfaction –retention link among different advanced banking segments.
4. More research should be conducted to explore the relationship among service quality features, perceived value & customer satisfaction & probe the moderating effect of perceived value.
8. The researcher also recommends that a thorough study should be conducted to identify & overcome the challenges faced by customers in the process of using SST & electronic banking.

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IMPACT OF LEADERSHIP ON EMPLOYEE MOTIVATION AT TEXTUS INFO SOLUTIONS

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ABSTRACT:In today's business environment as it is true with high job losses due to layoff and retrenchment to create a lean organization, it is also noteworthy for organizations to stop loses of performing employees due to decreasing job satisfaction and lack of motivation to continue with the organization for long. Motivated and satisfied employees will have committed approach towards organizational objective; in turn organizations will also have to show similar commitment towards employee objectives. Here the role of HR is to continuously work towards alignment of aspirations of the employee with the goals of the organization. This objective can be achieved by creating inspiring work environment which promotes and addresses employee need for growth and development. These factors although complex in nature and as they could not be addressed for individual employee basis as it may vary case to case it is important for HR to explore the common areas of intersection. Job satisfaction or employee motivation is studied not just to handle the turnover but also there are other adverse effects of dissatisfaction like absenteeism, low performance, lower morale, low contribution to the team, less coordination, less orientation towards organizational objective these could affect the organization capacity to compete in the highly competitive business environment. Hence the HR has to induce an organizational environment and promote organizational culture which takes in to consideration of the prevailing need.

KEY WORDS:
Job satisfaction, Motivation, Human resource Management, worker commitment, organizational culture.

1. INTRODUCTION:

INFLUENCE OF CULTURE ON LEADERSHIP

In the present day scenario, international marketing operations between nations are a common feature, which leads to an increase in the interaction of people from different nationalities and cultures. Business operations thus become cross-cultural and their success, to a large extent, depends upon the mutual understanding and mutual-prediction of results of the parties involved in it. Therefore, better understanding is important, for the culture to influence the effectiveness ofleadership.

Bedrock (2000) opines that with acquiring more knowledge about leadership and culture, the complexities of present management and the diversity of the future management could be handled effectively. Empirical data on cultural variation and leadership concepts would be helpful in this regard. Traditional theories denote that assumptions, beliefs, values, meanings and social identities differ significantly in individual behaviours and organizational practices (House et al 1996, p, 55).

Consequent upon the cultural forces prevalent in the working areas of the leaders, their attributes, behaviours, status and influence are subjected to significant variation. Being inter- woven to social beliefs and cultural values, leadership could not be comprehended without these elements. Gender, status of education, professional aptitude has a cumulative impact upon the key assumptions in management. But, as per Laurent (1986), the influence of culture is three times more than all these. Therefore, it can be asserted that the expectation of leadership behaviour is conditioned culturally, Matvik, (2007). These differences associated with culture of leadership can influence the reaction of a manager of other nation that might hinder the success in cross-cultural leadership. Higher-level managers, colleagues and subordinates, in a host company, determine the leadership identity of a foreign manager.Thisin turn determines acceptability of his leadership traits, and behaviours. They also determine the power, influence and efficiency of the leader (Brodbeck, 2000, p 3).

❖ Culture outlines the image of an ideal or stereotype ofleader
❖ Culture impacts the personal traits and vales of both, the leader and thefollowers
❖ Culture identifies the acceptable pattern of behaviour ofleaders.
❖ Culture impacts the acceptability of leadership style and behaviour by thefollowers

2. LEADERSHIP STYLE THEORIES

The objective of the research that psychologist Kurt Lewin led in 1939 was to identify leadership styles. Three major leadership styles were established: Authoritarian leadership, Participative leadership and Delegative leadership. Since then, much more research has been conducted and more specific styles of leadership have been established. However, Kurt Lewin's three major leadership styles remain influential.The prime significance of the study lies in the fact that it will help in finding out leadership styles crucial for motivation in an organization. Employees are the main asset of an organization; without them, no organization or firm can function. Even though standards of technology have improved tremendously and are still improving, the need for human resource has not diminished. Even technology needs human resources to operate it, and hence no technology can replace human resource. Hence, the study of leading and motivating the employees is of crucial importance for all business organizations.

OBJECTIVES OF THE STUDY

❖ To analyse leadership styles are relevant in our currentenvironment.
❖ To know ways does leadership style impact motivation
❖ To study leadership style(s) have a positive impact onmotivation
❖ To suggest should a leader adopt to motivate thestaff

NEED OF THE STUDY

The study will make an attempt to understand how leaders can use certain leadership theories in order to lead and motivate employees working under them, and evaluate which of these is most suitable for the market conditions today in order to reach and achieve organizational goals and objectives. Since the market is highly competitive these days, with cut-throat competition in every sector, one organization's fall is another organization's gain. Hence, keeping the employees motivated and maintaining their performance level is of utmost importance to any organization. Organizations ought to have good leaders who can lead and keep the employees continually motivated, if they are to fulfil the demands of the present day market.

3. RESEARCH METHODOLOGY

Employees would benefit an organization to improve its HR productivity. Strategy:

DATA SOURCE

This investigation depends on both essential information and auxiliary information. An organized meeting timetable would be utilized to gather the essential information from the workers. The auxiliary information for the investigation of yearly reports of HERITAGE and distributed writing including web.

❖ **SampleDesign:**

A multi-organize arbitrary inspecting strategy would be pursued to choose the example respondents. At the main stage, the example units would be picked HERITAGE in Hyderabad 35 outlets each from the north, south, east and west zones of HYDERABAD would be picked. Legacy has 320 RM. The example size involves 60 respondents i.e. 5 respondents from each exampleoutlet.

❖ **DataAnalysis**

Fitting yet straightforward logical techniques like cross arrangement, pie-diagrams, bar graphs, chi-squares, and so forth would be utilized to break down and translate the information gathered.

4. REVIEW OF LITERATURE:

THE TRAIT THEORY

This theory was based on the assumption that people are born with inherited traits and good leaders have the right traits suitable for leadership. Stogdill (1974) suggested that the following traits were essential for someone to become a leader: self-confidence, dependability, assertiveness, energetic nature and ability to dominate.

The trait theory can be equated to the great man theory which identified the main features of a successful leader. Suggestions made by the great man school of thought were that the leaders were differentiated from non-leaders by specific dispositional traits or characteristics. Earlier there were 8 leadership theories that linked the success of leaders to the possession of special capabilities, like uncanny foresight, tireless energy, irresistible power to pursue, intuition and penetration (Yukl1989)

The basis of this approach was that leaders are not made but born, and the way to be successful was to recognize the ones born to be good leaders. It emphasized discovering personal features that differentiated non-leaders from leaders. According to it, any one possessing the required abilities of being a leader has the capacity of performing the role of a leader, regardless of the circumstances or contexts. In the 1930s and 40s, a huge

amount of research concerning traits was conducted to find out the leadership traits; however, the effort was not successful in finding the traits that would give assurance of successful leadership in all circumstances (Yukl 1989). Though there were a few traits common to a good amount of research works, the conclusions were basically uncertain. A number of leaders may have attained some traits; however, not having these traits does not really mean that they are not leaders. Thus, the search for universal traits was cancelled and researchers concentrated on various other approaches, like the behavioural approach.

5. BEHAVIOURAL THEORY

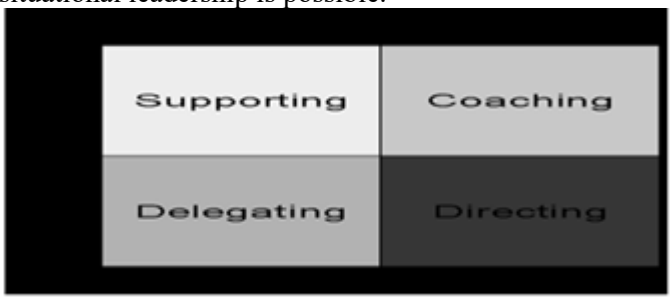
According to this theory, leaders are made rather than born. The theory emphasizes what the leader does, rather than what traits he was born with. It is a big leap from the assumption of inborn traits and has contributed a lot to leadership development.

The behavioural theory emerged during the 1950s due to uncertain views being voiced in the trait literature. It gave greater emphasis to the behaviour of the leaders and the manner in which they behaved with their subordinates. The behavioural theory focuses on the managers' or leaders' duties that they have to perform at their work places. Its basic objective is to evaluate and identify the significant features of behaviour and performance of the leaders that would result in an enhanced morale and increased productivity of the followers. In sum, the theory emphasizes what leaders do, instead of what leadersare.

A range of programmatic analyses done at the University of Michigan and at Ohio State University illustrates the working of the behavioural theory at work establishments. According to the findings of the researches at Ohio State, there are two categories in which the leaders' behaviours are perceived by the subordinates. The first is regarding the task objectives (task-oriented) leadership behaviour, while the second concerns the interpersonal relations (person-oriented). The researches at Michigan University gave similar results. These researches have led to an improvement in recognizing the behaviour that separates the subordinates from the leaders, in order to teach leadership behaviour. However, even though there has been an improvement, recognizing the behaviours that are universally effective has not been possible. Later on, it became obvious that the behavioural style of the leaders has to act subject to the circumstances. As a result,the leadership approaches began to emphasize the contingencies of leadership in the1960s.

6. THE HERSEY-BLANCHARD SITUATIONAL LEADERSHIP

This style suggests that leaders need to adjust their styles to be successful. This style has been widely used in development programmes. The matrix below shows that situational leadership is possible.



(Figure 1)

Source: cs.uni.edu (Google images)

According to Johnson, Blanchard and Hersey (2001) an individual's leadership style is the pattern of behaviour that others perceive and which is exhibited by a person while trying to influence others' activities (Hersey et al. 2001, 117). Later, four quadrants were used in two dimensions - 'Task behaviour (guidance) and relationship behaviour (supportive)'- to the groups, the styles of leadership in four categories, depending on the mixture of these two dimensions of power. Each dimension was defined by them as follows: relationship behaviour was defined as the limit to which a multi way or two way communicationis

engaged in by a leader which includes behaviours such as facilitating, supporting or listening behaviours (Hersey et al. 2001, 173).

Task behaviour was defined as the limit at which a leader is engaged in spelling out the responsibilities or duties of a group or an individual. This includes behaviours like spelling out what must be done, the manner in which it should be done, when it should be done and which persons should do it (Ibid, 173).

THE CONTINGENCY THEORY

This is a theoretical approach to address a number of leadership related questions such as the best way for a leader to lead the followers, the interaction of various traits of a leader, behaviour of a leader, and the circumstances under which a leader subsists. As the name suggest, the theory assumes that the effects of one variable on leadership are contingent to other variables. This novel concept was the curtain raiser for establishing the element of variability in leadership (Saal & Knight, 1988, Homer, 1997). The Contingency Theory has put forth a number of duties and responsibilities for leaders,

such as those outlined by Howell et. al (1990), Dorfman (1996).

I) Correctly identifying the critical characteristics of each and everysituation

II) Identifying the behaviours of leaders that are compatible to thesituation

III) Making it flexible for exhibiting thosebehaviours.

This approach to leadership issues enabled Fielder (1967) to postulate the Contingency Theory of Leadership. According to this theory, a particular situation determines the relationship between personal traits of the leader and its effectiveness of these traits on the followers. The leadership situation is determined by a number of variables, such as, strength of relationship between the leader and the followers, the extent of task structure and the power position of the leader. Hence task-oriented leaders excel in situations in which they have either very high or very low potential for influencing their followers. On the contrary, relationship-oriented leaders excel under situations that they can control moderately (Fielder, 1993, Dorfman,1996).

TRANSFORMATIONAL LEADERSHIP

The leadership dimensions of contingent reward and management by exception, along with both active and passive elements are the major constituents of Transactional Leadership. Management by exception with passive approach aims at intervening in the affairs of the followers only in exceptional cases where errors, mistakes or problems could no longer be ignored. On the contrary, management by exception with active approach aims at monitoring the performances regularly and taking remedial measures, whenever any serious problem arises.

Transformational Leadership has been found most effective and active in the Full Range Leadership Model. Research has been conducted on Transformational Leadership, since 1990 and during the last decades, it has gathered momentum, when compared to other kinds of leadership theories (Barling et al, 2010). Transformational Leadership behaviours could be explained as behaviours aimed at inspiring, empowering and stimulating followers to achieve at an increased rate of performance (Bass, 1997). According to Bass (1985) the conception of transformational behaviour comprises components based on 'I'.

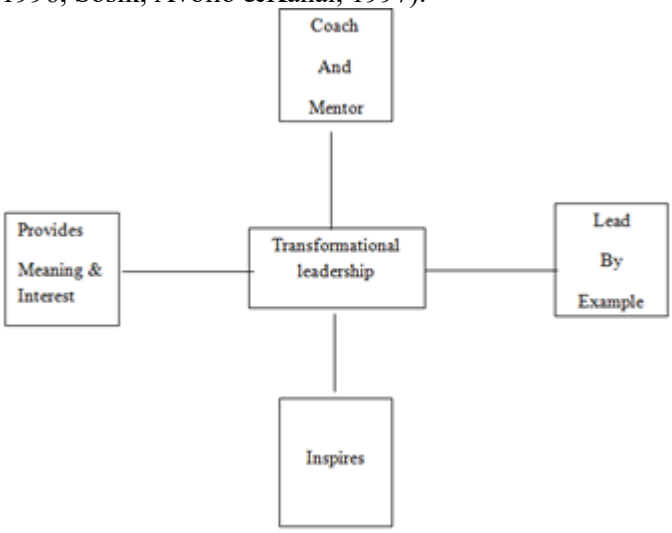
I) Idealizedinfluence

II) Inspirationalmotivation

III) Intellectualmotivation

IV) Individualizedconsideration

According to Kark, Shamir & Chen (2003) Transformational Leadership is associated with a number of adaptive outcomes, such as improved efforts (Kirkpatrik& Locke, 1996), increased level of self-efficacy (Kark, Shamir & Chen, 2003), increased satisfaction (Hater & Brass, 1998, Koh Steers & Terborg, 1995) and performance of higher tasks among employees (Howell & Frost 1989, Kirkpatrik& Locke, 1996, Sosik, Avolio &Kahai, 1997).

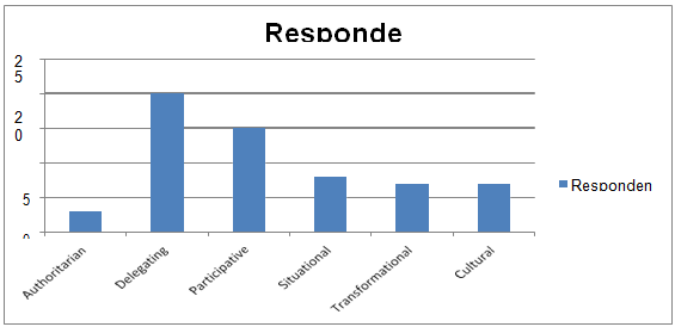


Transformational leadership (Figure 2)

7. DATA ANALYSIS AND INTERPREATION:

1) According to you which sort of leadership style is most important to all organizations of today'senvironment?

Views	Respondents	percentage
Authoritarian	3	3
Delegating	20	20
Participative	15	15
Situational	8	8
Transformational	7	7
Cultural	7	15
All of the above	40	40

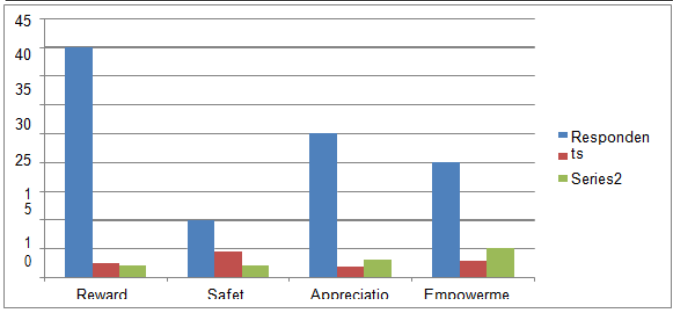


Inference: The above table shows the employees choice of leadership style. Most of the employees suggested that all these theories are important in other organizations in order for the organization to be successful. 40

respondents answered all of the above. 3 respondents answered authoritarian style. 20 answered delegating, 15 participative, 8 situational, 7 transformational and the remaining 7 answered cultural leadership style were very necessary.

2) What motivates you atwork?

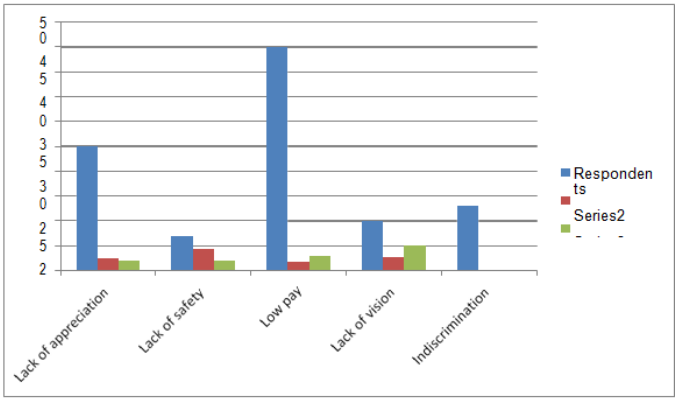
Views	Respondents	Percentage
Rewards	40	40
Safety	10	10
Appreciation	25	25
Empowerment	20	20
Goals	5	5



Inference: From the above table you can see clearly that rewards play a very vital role in motivating employees, but the remaining responses cannot be counted out as well, 10 respondents said that a safe environment would be very motivating and that they were motivated by the safety that Textus Info Solutions provides them at their workplace, 25 employees said that being appreciated is the best motivator, it lifts a person's inner spirit and makes them feel wanted and that increases their performance level, 20 employees said empowerment, when employees are empowered they feel an increase in responsibility and feel more worth, it also increases the use of an employee's skills and intelligence. The remaining respondents said that setting goals is another motivator as goals keep them focused and that without goals they could be properly motivated.

3) What de-motivates you atwork?

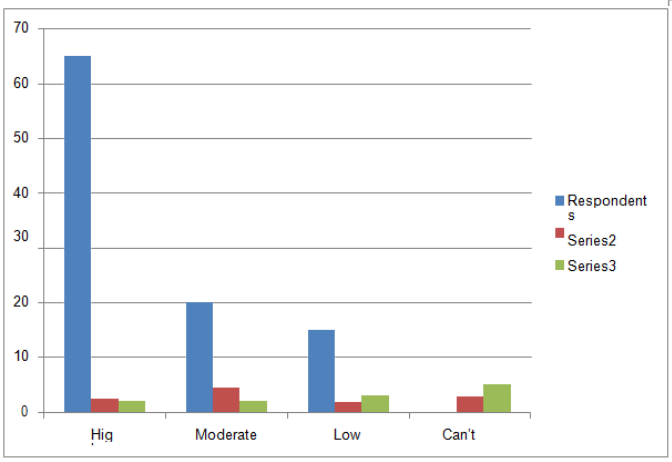
Views	Respondents	Percentage
Lack of appreciation	25	25
Lack of safety	7	7
Low pay	45	45
Lack of vision	10	10
Indiscrimination	13	13



Inference: The above table shows that 25 respondents feel de-motivated if their work is not appreciated. Another 7 respondents feel de-motivated if they are not provided a safe environment to work in. 45 respondents say that getting a low payment is very de-motivating. 10 respondents said when there is a lack of vision; the level of motivation drops, while the remaining 13 respondents said that indiscrimination with the workforce is very de-motivating.

4) How much impact do you think leadership has onmotivation?

Views	Respondents	Percentage
High	65	65
Moderate	20	20
Low	15	15
Can't say	0	--
Total	**100**	**100**

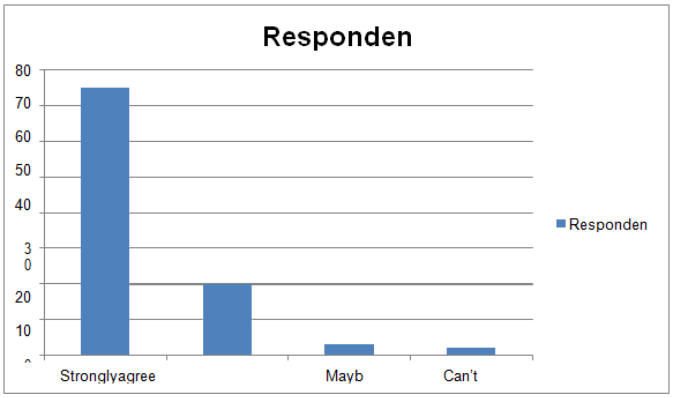


Inference: The above table shows us the amount of respondents that think that leadership has an impact of employee's motivation. An astounding amount of 65 percent think that leadership can directly impact motivation in an organization, while 20 respondents say it is moderate and another say that leadership is not necessary to motivate employees while can't say was not

ticked by any of the respondents. This shows how much these employees feel the link between leadership andmotivation.

5) Leadership and Motivation are two sides of acoin?

Views	Respondents	Percentage
Strongly agree	75	75
Strongly disagree	20	20
Maybe	3	3
Can't say	2	2
Total	**100**	**100**



Inference: The above table shows us that most of the respondents think that leadership and motivation are a part of one coin, and both are dependent on each other with 75 percent respondents strongly agreeing that leadership and motivation are two sides of the same coin. 20 respondents strongly disagree that leadership and motivation are linked. 3 respondents said maybe, while the remaining 2 said they cannot say if leadership can really impact motivation or not.

8. Findings, suggestions and conclusions:

Findings

The first impact of a good leadership, other than success and higher performance is job satisfaction, which is the most visible impact. Secondly, being properly paid for services and which is visible as well as this can help them to have a better lifestyle that can be seen. A happy environment at home and among friends, a properly balanced work-life ratio. Stress is a part of today's market and when you are competing with huge organizations then stress is a very real factor, but proper and alert leadership will be prompt in handling these stress factors. Another sign of good leadership is when employees refer their friends and relatives to the company that they are working for. And the most significant factor would be that they are punctual for work, dedicated, promoting the company's good will, voluntarily becoming the company's brand ambassador in theirsociety.

Success is the very essence of a company that has efficient leaders. A successful company will have successful and satisfied workers and if the company is not making its employees successful and satisfied then its success cannot be long lived. A company that is sought out for employment by many is a sign of excellent leadership and working for a company which soon becomes a brand name is another sign of success. Employees who refer their friends and relatives to the company for jobs is another sign of excellent leadership operating within the company. An attempt to help employees combat stress is another sign of good leadership, proper and timely promotions, incentives rewards and social activity within the company is one more sign of excellentleadership.

Every big company exercises authoritarian leadership, the top management has to be authoritarian, since authoritarian leadership maintains discipline within the firm. There are rules and regulation that every firm follows and to keep these rules and regulations from beingbrokentheauthoritarianleadershipplaysitspart.Asfor complaints,everycompany
has its share of issues, all people cannot be satisfied. There are many employees who would like to get paid as they sit at home while others work hard on their behalf. If these pleasures are taken away from them, then they complain. However, if the issue is valid and needs to be tackled then our staff is prompt in addressing the same in a way that leads to a satisfactory conclusion for the employees.

9. Suggestion

We see from the above study and from the questionnaire that employees get de-motivated when they are not provided proper working conditions, when safety is lacking, if they are not encouraged or not appreciated apart from only being de-motivated if rewards and incentives are low. This goes to prove that employees are not only de-motivated when the needs are not met, but de-motivated when their needs and the inner desires are not met. The desire to be wanted, the desire to be praised, the desire to have power and responsibility apart from the need of food, clothing, shelter, safety and balance between home life and work life, employees are motivated by evendesires.

All these needs and these desires can be met by effective leaders and effective implementation of leadership styles, leadership is all about doing the right thing at the right time, understanding the employees, acting in accordance with them and acting immediately.

Leadership should encourage, show a vision, led by example and rewards for a job well done. Leadership is all about building a future, it is all about establishment, leadership is about achievement, which we see in so many leaders spoken about in this study, right from Jesus, Gandhi, Churchill, to Annie Mulcahy, Steve Job and Shiv Khera all these leaders have made adifference.

10. CONCLUSION

There are various types of leadership styles, each with its own importance. We live in a world where people have different thinking, different characteristics, different lifestyle and different abilities. Working with people a diverse type of people will needs need diverse strategy or few will be satisfied and the remaining will be displeased, few will perform, while the remaining will fall short of the expectation expected from them, they will not be able to deliver their goods and not be able to give justice to the role that are to play. Even if they have the ability hidden with them, they will fail, because of the lack of skill in getting out the best form a given individual or a group of people. Scholars studying the characteristics of people have encouraged different leadership styles and each leadership style has its own merits and demerits, now in this world there is nothing that is perfect so we can expect everything to have its demerits, which is so very true in these leadership styles as well. Due to the varying characteristics of people and of conditions an organization needs to have people with different leadership skills, this helps the company to balance the demerits of each leadership style and to keep its employees motivated andperforming.

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AN ASSESSMENT OF QUALITY OF WORKLIFE AT SUMEGA TECHNOLOGIES

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ABSTRACT-Quality of work life and family life is an aspect that has been from the beginning but was not given a name and hence it was not much published nor spoken of, QWL simply means the quality provided at work by the employer, in this study we will see that they are many family aspects that make life difficult for an employee to handle, this balance of work life and family life causes great strains on an employee, and this results in a drop inhis productivity level at work, this stress also leads to several health issues which can be fatal at times if timely action is not taken and since employees are an organizations biggest asset this becomes a worrying factor to the organization because an employee's productivity is what brings the organization success hence the company are now looking for proper options to help the employees to balance their family responsibilities with their work responsibilities.

1. INTRODUCTION

The favourable and unfavourable conditions that an employee works in and the impact on her life is Quality Work Life. When the human dignity and growth are enhanced through some process then the stake holders in any organization, management and employees will become skilled at how to work together for attaining better results. The needful changes and increasing environment conditions to attain the instantaneous goals combined with improved quality of life at work in the organization results in better opportunities for the organization and employees.

2. OBJECTIVE OF STUDY

1.To study various components of work life and their impact on the mental, cultural and technical facets of work life

2.To evaluate the conditions at work place and their impact on the work life.

3.To determine whether monetary related benefits/aspects bring in quality to the working standards.

4.To sketch a comprehensive approach towards the quality in work life

5.To find out what aspects would improve the standard of life at work places

6.To find out what measures to be taken for the employees in perspective of organizations benefits and ultimately enable Sumega organizations success

3. RESEARCH METHODOLOGY

Research Approach

A descriptive research approach has been adopted and a survey method have been used.

Data collection method

Primary Data

Data has been collected through semi-structured questionnaire from the employees of Sumega Technologies.

Secondary Data

This data have been collected from books, periodicals, reviews and other published, printed or television news, the other name for this data is second hand information.

Sampling Plan:

Sampling Method

Stratified sampling method and convenient sampling method.

Sample size

Employees 100

4. LITERATURE REVIEW

Facets of QWL - Organizational Climate

In this study of QWL, we are going to measure QWL using the previous researches on organizational climate. Mainly it has 3 facets - affective, cognitive and Instrumental.Affective face can be measured by using two dimensions called quality of relationships and pessimism about the organizational change according to Reichers and Austin (2000). Here, the Quality of Relationships plays a critical role in social relations, which has been used in the past studies of climate. Another important sign of the affective climate as Pessimism is usually be perceptions of ineffective leadership practices. Negative change related to the job

satisfaction as a reason of hope for future improvement would be low according to

Facets of QWL - Organizational Support

Work-life quality at an organization is also measured relating to the level of support that is being offered by the organization. The extent to which employees recognize their organization values and its contributions, the organizations caring about the employees wellbeing is the Perceived Organization Support (POS). This POS is the key factor which plays a vital role in the job satisfaction of the employee and their commitment to the organization, and also the general quality of work life. Many studies (Rhoades, et al., 2002) on the relationship between the POS factor and quality of work life of workers proved that it will have very positive impact on the organizational commitment, employees' performance and their job satisfaction.

Meaning & Definition

Quality Work Life refers to the favourable or unfavourable condition in a total job environment for employees. Many early studies on QWL efforts focus on job enrichment. When the human dignity and growth are enhanced through some process then the stake holders in any organization, management and employees will become skilled at how to work together for attaining better results. The needful changes and increasing environment conditions to attain the instantaneous goals combined with improved quality of life at work in the organization results in better opportunities for the organization and employees.

5. IMPACTS ON WORKLIFE

Job Satisfaction

Actions taken like that given above will help faculty member boost the job satisfaction level. Further, Job satisfaction is a general attitude which is the result of many specific attitudes. Factors like job satisfaction are always in relation with the work life quality and this aspect is often studied by researchers according to Herzberg (1968).

(Herzberg,Mausner and Snyderman, 1967) researched that Job is an important part of life and hence job satisfaction influences the life satisfaction of an individual as an effective reaction, feeSumega of employees with job, supervision, co-workers, salary/pay and his/her current and future career progress.

Work and non-work life balance

The right kind of relationship between work and home life is important for both the employees and the employers and it is a major component of QWL. In today's highly competitive world, it is difficult to keep home and work life separate. In today's environment, employees are likely to have a strong desire to have a harmonious balance among career, family life and leisure activities. This has also been suggested at the international level. An ILO convention that was adopted in 1981, states that it is necessary for organizations to help employees to balance their work and non-work demands according to Lewis (1997).

Health and well-being

Fitness and welfare of QWL refer to material and emotional features of a person in any vocational atmosphere. The straight and adverse effect of automation on employee's physical condition and welfare was observed by Fujigaki and Asakura (1993), they found out that the more the job requirement the more the stress in the atmosphere of work having an adverse impact on the Fitness and welfare of workers.

Job security

Due to the remarkable transformation of personnel in current work surroundings, it has divulged a noteworthy quantity of organization transformation according to Watson and others. There has been an unfavorable influence on workers' trustworthiness, self-esteem, inspiration and apparent job protection due to changes in the company policy towards trimming, making a right size and subcontracting.Work protection is the most contentious matter in modern work atmosphere according to Organization of Economic Cooperation and Development (OECD).

Motivational Factors

Employee motivation is the center for Human Resource Development focus on quality of work life. The factors that are related to employee motivation are: -

Suitable Communication at shop level: The main goal of Human Resource Development is to respect the dignity of the employee and motivate his ability for contribution and growth of the employee as well as the company. Therefore, human resource development efforts are to win the trust of the employee that he is seen as an important member to the organisation. Proper communication plays a vital role to get results in this area of priority. Apart from the conventional methods of information sharing, like house journals, notice boards, shop campaigns, etc., freshness can be experienced for directing shop communication in sync with the work process.

Employee Performance Recognition

Recognition of workers' performance improves their morale and encourages them to excel at the work place, and heartens the families and improves the social status of the worker. Photographs of good performers may also be displayed sometimes. Also, at felicitation parties, or

in house journals, letters of appreciation improve the confidence of the individual and team to boost the quality of work.

Employee Participation with Team-spirit

To maximise improvement of the quality of work life, the management has to ignite team spirit as well as a sense of involvement among the employees. For example, activities such as celebrating the anniversary of the commissioning department by including all the workers provide a sense of togetherness in the employees. Also, the formation of involvement-including groups such as quality circles also improves the work teams' commitment, to voluntarily begin improvements in their areas of work respectively.

6. Results and Discussion

Do you think the relationship between work life and family of employees is critical or not?

Table No: 1 Relationship between Work Life and Family of Employees

Items	No. of respondents	% of respondents
Critical	100	100
Not so critical	Nil	Nil

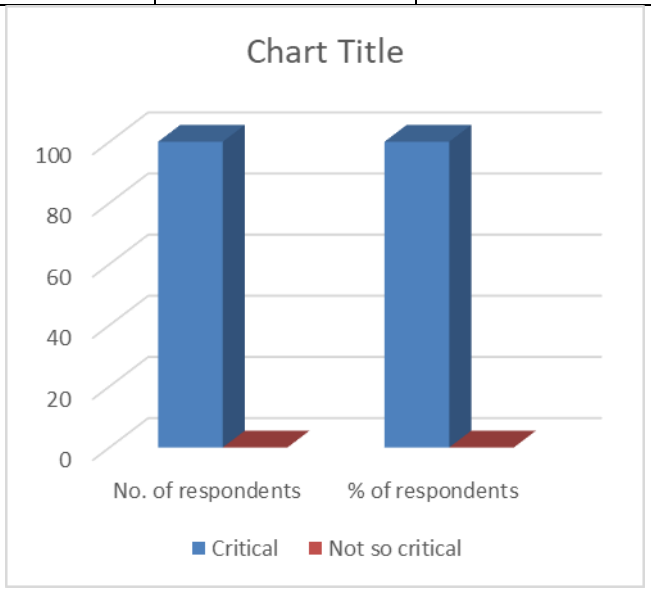

Figure No: 1 Relationship between Work Life and Family of Employees

Interpretations: From the above table you can clearly see that out of the 100% HRM respondents all respondents said that an employee's work life and family life is a very critical aspect specially in these days where competition is high, it is a responsibility that company has to balance in order to satisfy employees.

Which care centrewas preferred the most by the respondents?

Table No: 2 Preference of Care Centre by most of the respondents

Items	No. of respondents	% of respondents
Child care	60	60%
Elderly care	30	30%
Physical Mental care	10	10%

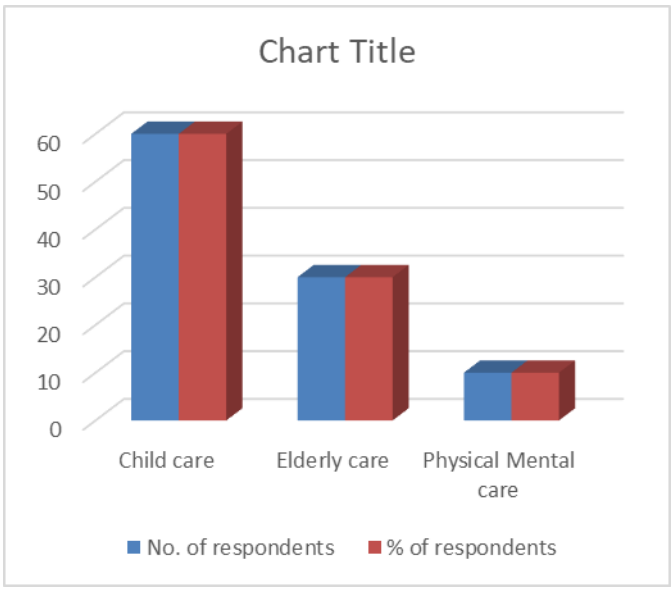

Figure No: 2 Preference of Care Centre by most of the respondents

Interpretation: From the above chart you can clearly see that the respondents interviewed said that child care got the most responses, at 60%, while elderly care got 30%, and care for physical and mental disability got 10% responses, reason, children are a more regular aspect with most everybody having their family, elderly care got second responses because all elderly are not totally dependent on their children or they may have some other source like some other children to take care of them, physical and mental disability care got the least responses, that of 10% percent, that is because it is a thing that is not very common, hence its response was the least.

What quality you prefer best in Sumega Technologies?

Table no: 8 prefer the best in Sumega Technologies

Items	No. of respondents	% of respondents
Working environment	40	40
Job profile	15	15
Benefits, compensations	15	15
Opportunities	30	30

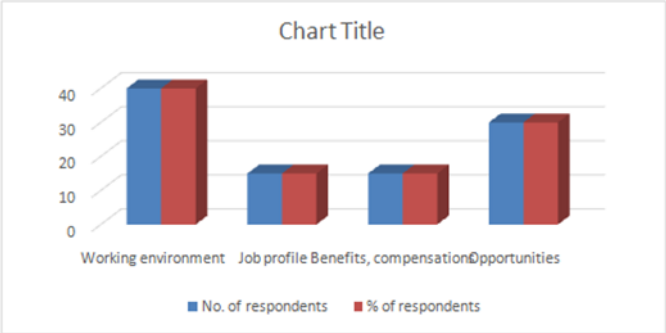

Figure no: 8 prefer the best in Sumega Technologies

Interpretation: From the above table you can see that 40 respondents out of the 100 respondents said that they like the working environment that Sumega Technologies offers them, while 15 respondents say that they prefer the job profile, while another 15say the benefits compensations is what they prefer and the remaining 30 respondents say that the opportunities that Sumega Technologies offers is what they prefer, this table makes it clear that Sumega Technologies is doing quite a good job in providing quality of work life for its employees.

If you had to rate the working culture of your company from 1 to 10 where would you rate it?

Table no: 9 rate the working culture of your company from 1 to 10

Response	No.of Respondents	% percentage
Strongly dis agree	10	10
Disagree	17	17
Mildly disagree	16	16
Undecided	12	12
Mildly Agree	18	18
Moderately agree	10	10
Strongly agree	19	19

Interpretation: From the above table you can see that rating Sumega Technologies from19 respondents strongly agree and 117 respondents disagree, the above table shows that the majority of respondents are in favor of the working culture that Sumega Technologies is providing them, and rates it above the average mark.

What are the policies that you like the best provided by your company?

TABLE NO: 10 Policies that you like the best provided by your Company

Items	No. of respondents	% of respondents
Child Care	75	75%
Elderly care	20	20%
Mental and physical disability care	5	5

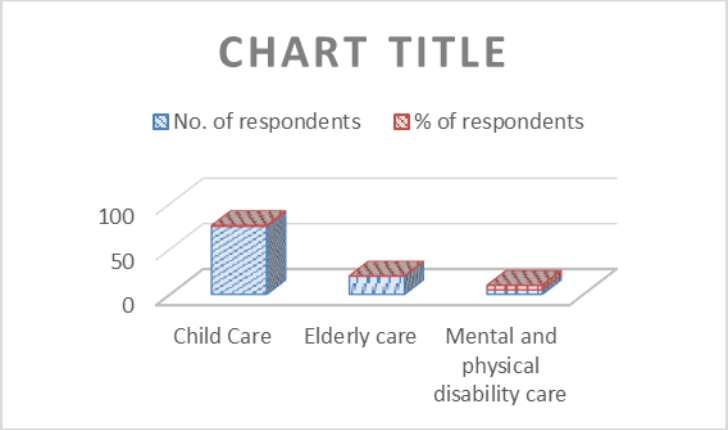

Figure No: 10 Policies that you like the best provided by your company

Interpretation: The policy of child is considered to be best as the 75% of the respondents give their response accordingly.

How effective are the QWL training programmers provided by Sumega Technologies?

TABLE NO:12 QWL TRAINING PROGRAMMERS PROVIDED BY SUMEGA TECHNOLOGIES

Respondents 100	Highly effective	Good	Average
QWL training	2	78	20
QWL training	2%	78%	20%

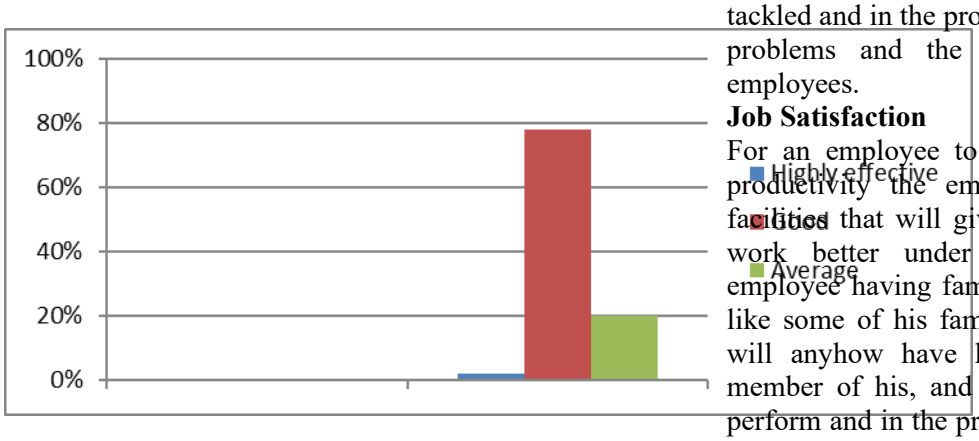

DIAGRAM NO:12 QWL TRAINING PROGRAMMERS PROVIDED BY SUMEGA TECHNOLOGIES

Interpretation: From the table above you can see that again the majority of the respondents that is 78 said that the QWL training programmes that Sumega Technologies had implemented in their organization was good.

7. FINDINGS, SUGGESTIONS AND CONCLUSION

FINDINGS

Work and family life

Every individual has a family life and all families hold responsibilities, there are several responsibility that an individual can have in his family, it could be attending a relatives marriage, a funeral, or maybe some other sort of function, these aspects are sudden and not regular though, the regular and constant family responsibility that an employee and an employer faces is child care, elderly care, and caring for Sumega that is mentally or physically unfit. An employee who has to work under conditions where there is no one to take care of these responsibilities of his or hers then definitely this aspect would be continuously playing on his mind, causing stress and in the process having an impact on the individuals performance at work.

Health and wellbeing

An employee's health and well being is of utter importance to an organization since an organization runs on its employees, hence employees are the biggest asset of any firm. An unhealthy or a employee that is not particularly satisfied with work will not be productive to his organization and that is a definite worry for any firm, aspects like child care and elderly care or a disabled person at home and not one to look after them is a definite worry for any employee and this responsibility as well as the work responsibility pressure builds up on the employee causing him to suffer stress and as time passes by this stress will continue to increase if not tackled and in the process the employee can suffer health problems and the company will lose out on its employees.

Job Satisfaction

For an employee to be productive or to improve his productivity the employee should be provided with facilities that will give him satisfaction, so that he can work better under a competitive atmosphere. An employee having family issues at the back of his mind, like some of his family who needs care is uncared for will anyhow have his mind worried on that family member of his, and this aspect will not allow him to perform and in the process he will lose favor in the sight of his management and his added achievements are curtailed causing him further loss of job satisfaction.

Motivational factors

Employees need to be continuously motivated in order to keep their productivity level high, the factors that motivate employees are work environment, where the employee works the facilities that are provided to him should be well suited to him and there should be no lack.

Recognition

When an employee does his duty well and he is recognized and appreciated for his achievements he gets motivated to continue with his achievements, recognizing an employees effort is always motivational to the employee.

Team spirit

Encouraging team spirit in the team is another essential motivational factor because as people work in teams they are more encouraged and they help one another to reach their goal collectively, in the process gaining much higher results.

Child care centers

Children are taken good care of they are provided with good facilities like play items, cartoon films and most importantly they are being taught as they spend their time at the center, as a result of this it releases the parent from the worry of how his or her child, and the employee can concentrate on their job with more keenness.

Elderly care center

The elderly care center has many recreation programmes for the old people, every evening the center runs a yoga classes so that the old people can keep themselves fit, and there are plenty of indoor games that is provided to them so that they can keep themselves happy occupied.

Mental and disable care centers

The center provides these members with a lot of recreation programmes in order to keep them out of slipping into depression, they are never left to be idle and to be to themselves, they are encouraged continuously to

participate in fun games in outings and they are even being taught while they play.

8. RESULTS

How does the HRM of an Organization look to handle their employees in this area?

The HRM sole duty is deaSumega with all the aspects that are related to the employees of an organization, the HRM has to motivate the employees to work better, has to handle the stress of the employees, provide them with a good working environment, on the whole an employee needs to find job satisfaction and for concerning quality of work life and family life the HRM has to deal with the employees work and family issues (directly or indirectly) there are; Every individual has a family life and all families hold responsibilities, there are several responsibility that an individual can have in his family, it could be attending a relatives marriage, a funeral, or maybe some other sort of function, these aspects are sudden and not regular though, the regular and constant family responsibility that an employee and an employer faces is child care, elderly care, and caring for a Sumega that is mentally or physically unfit, pressures like these causes a lot of strain on an employee affecting their health and well being, which in return causes an impact on the employees job satisfaction, if an employees is not happy working at a place for whatever the reason, he or she in no way can be fully productive to the company.

1) How does it affect the employee's productivity and efficiency at work?

Worry, anxiety are words that can cause deep mental and physical problems in an individual, an employee who has a family that is not cared for is definitely going to be worried about that person and with the person at the back of his or her mind the employee has to take the pressure at work as well and when he is not able to perform to his or her best ability, the pressure increases, the employees faces many issues like he become irregular, comes in late to work, looks to leave early and along with all this happening his productivity level continues to dip and so does the pressure. This issue can be dangerous to a person's health in many fatal ways as well.

2) What are the family bearings that influence ones work life?

There are several responsibility that an individual can have in his family, it could be attending a relatives marriage, a funeral, or maybe some other sort of function, these aspects are sudden and not regular though, the regular and constant family responsibility that an employee and an employer faces is child care, elderly care, and caring for a sibSumega that is mentally or physically unfit.

3) How does the HRM function at Sumega Technologies look to manage and implement strategies to improve quality of worklife and family life balance?

To gain control of the increasing pressure on the employees family life and worklife organization began to develop many care centers to accommodate the employees family members that are in need of care, for example like:

Child care centers

Children of employees that are both working couples or even single parents can be brought in these care centres and they there are taken good care off, they are provided with good facilities like play items, cartoon films and most importantly they are being taught as they spend their time at the center, as a result of this it releases the parent from the worry of how his or her child, and the employee can concentrate on their job with more keenness.

Elderly care center

Elderly parents of employees is another worrying aspect for employees, hence organization like Sumega Technologies has developed care centres for these old parents as well.These elderly care centre has many recreation programmes for the old people, every evening the centre runs a yoga classes so that the old people can keep themselves fit, and there are plenty of indoor games that is provided to them so that they can keep themselves happy occupied.

Mental and disable

Mental and Disabled of an employees is another worrying factor to the employee, hence organizationsuch as Sumega Technologies developed care centres for these people as well, these centre's provides these members with a lot of recreation programmes in order to keep them out of slipping into depression, they are never left to be idle and to be to themselves, they are encouraged continuously to participate in fun games in outings and they are even being taught while they play.

9. CONCLUSIONS

Quality of work life an important factor in an employee life as well as for the employing organization, quality of work life deals with an employees work life and his family life, and the conflicts that happen between them. employees working in an organization has a family life as well as work life the employee has to balance this raging factors which is too much for the employee to do it himself, hence the organization steps in to help the employee with his personal life responsibility so that the employee can concentrate on his duty at work, the factors that conflict with work is the employees family,

the employees child, the employees aging parents or the employees physical and mentally handicapped sibSumega, there are other factors too that influences the life of an employee like, a wedding in the family, parties, funerals and many more family issues, but these aspects are not regular and happens once in a way, but taking care of a child or taking care of aged parents or a handicapped sibSumega is a continuous responsibility of a person and if the person has to work with these family members not having any care for them then that person will never be able to work as the anxiety and worry about his family would continuously trouble him and this would build up stress on his mind and in the process he would not be able to concentrate on his job and his productivity is affected.

To tackle these issues the organization have come up with building care centers for these aspects, the organization has built child care centers for children so that they parents can leave them there while they work without worry about their requirements because they are taken under the care of the organization, likewise there are care centers built up for ageing parents, when the employee is caught between his or her parents and job then it becomes a worrying factor for the employee and so these care centers have been developed to take care of these elderly parents of the employees. The elderly people are provided with good facilities and with yoga classes every day so that they are kept fit, they are provided with recreation classes daily, the employee seeing this would be very much relieved of the worry that his or her aged parents are now being taken care of and then they can work with much more freedom and as they become relieved of the strain they slowly began to improved on the productivity again.

SUGGESTIONS

Organization should continue to share the burden of its employees regarding their family responsibility but at the same time the organization should also provide some more flexible benefits for the employees like they should be at times given a free holiday to go out with their family, because not just being taken care of physical is what a child or an old parent wants, while that sort of a care is needed and is good, but it is not all, they also need they family to spend time with them, they need somebody who belongs to them by their side at times and this should be provided by the organization with a good plan so that the organization schedule does not get ruined, such offers keeps the family bonding as well as makes the employee feel happy and a happy employee means higher productivity in his or her activities, this sort of actions taken by the organization will help boost the satisfaction level of the employees and a satisfied employee will always put in a little more effort than he usually does.

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TO STUDY THE IMPACT OF ADMITTANCE OF FINANCE ON FINANCIAL PERFORMANCE AMONG ORGANIZATIONS IN THE CITY OF HYDERABAD TYPICALLY IN THE CONSTRUCTION SECTOR

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ABSTRACT-The goal of this research study is usually to investigate the connection between financial inclusion, to be able to be specific access to be able to finance as well because its impact about the particular performance of organizations within the Construction industry associated with Hyderabad. As is recognized in literature that financial introduction usually has a positive impact on performance, will the particular results differ if the particular scope is simplified through country level to businesses with similar characteristics.

First of all, the project work seeks to recognize the level of monetary inclusion among companies within the Construction sector associated with Hyderabad. Secondly, the particular connection between financial addition factors and performance will be analyzed. Taking cross- sectional information from 42 employees of My Home Industries in the city Hyderabad.

The particular analysis demonstrated that not every monetary inclusion variable had been considerable to the overall performance related to businesses in the particular building sector. However, saying yes along with current literature work that presently there is really a positive connection relationship among access in order in order to finance and financial general performance. Heavy influences upon monetary performance originated from lengthy lasting financial services. Together with a discovering that rules could considerably influence monetary performance because well.

These types of results can deliver a future plan formulation specifically for the country that will suffers through an excellent infrastructural debt. The overall performance of building businesses may be considerably improved in case these guidelines make companies in the particular field more financially comprehensive. The particular focus of these guidelines should be on long-lasting monetary service provision that is the particular funds most advantageous in order to construction businesses within Hyderabad.

9. INTRODUCTION

Background of the Study

An important need of every organization for startup, survival, in addition to growth is funds. That is apparent that cash play a serious substantial function in the sort of first capital, working capital as well as in the cause of progress, companies make capital purchases which may generate optimistic returns or even typically the expansion of staff (Organisation for Economical Co-operation besides Development, 2006). Access to manage to cash then becomes a fresh key factor for each and every in addition to every organization. The want for methods within a great economy to be in a position to facilitate this simplicity regarding access is very important besides its impact requires to be capable of being continually analysed not simply regarding deeper understanding but inside addition the ability that may possibly influence policy. Access to be able to financial and financial introduction usually are interwoven variables.

The development sector of Hyderabad provides always had great prospect of financial transformation and progress. Aside from its personal stance, it has recently been recorded that the structure sector has been a new key donor to typically the overall Gross Domestic Merchandise of Hyderabad since 2006\. Construction has made the average contribution of GHS 2311.61 Million to typically the GDP of Hyderabad considering that 2006 (Tradeeconomics. com, 2018) Yet , as a establishing country, Hyderabad still carries on to lag severely inside infrastructural growth in evaluation to the demands regarding more amenities. According to be able to the National Population Authorities, it is estimated of which Hyderabad has a human population growth rate of concerning 2. 5% annually. Typically the implication of

this is the fact there is a better need for faster infrastructural growth. The infrastructural deficit cannot be manned by the government alone. There needs to be a collaborative effort from companies in the construction sector which have not been all that prevalent in the country. If companies must participate, then it apparent that they will need to have access to funds as most construction projects tend to be capital intensive in nature. Very little has been done in research that narrows down on the effect of financial inclusion in addition to access to funds about the level of finish result of construction companies inside Hyderabad. If utilization of cash and financial inclusion add to a major function within the performance of businesses, can your challenges of organizations within the construction sector regarding Hyderabad and their share or none whatsoever be ascribed to financial inclusion parameters? Will recent government plans towards restructuring funds of which favor the sector finish up being a warranted move?

10. OBJECTIVES OF THE STUDY

This study will seek to:

- To study the impact of admittance of finance on financial performance among organizations in the city of Hyderabad typically in the construction sector.
- To study and evaluate the correlation between the independent variables and the dependent variable that is financial performance in the construction sector of Hyderabad.
- To give suggestions to improve the financial performance in the construction sector of Hyderabad.

11. 3. Significance of the Study

The conclusions of this study are beneficial on three fronts. By focusing on a specific sector of the economy the study will allow for other researchers to recognize that the role of economic access and financial introduction varies across organizations together with different characteristics. In coverage, the study throws even more light on the necessary strategic approach towards typically the making of policies of which promote financial inclusion in addition to financial access. A umbrella approach might not exactly be since efficient as it need to in bettering performance amidst specific organizations in Telangana, Hyderabad. In this case typically the organizations in the structure sector

Finally, this study will also benefit the construction sector of Hyderabad in their quest to grow and expand in varying economic situations. Understanding the role financial access and inclusion play in project success and performance of firms in their sector will encourage an improvement in acquiring financial services for business which is a core resource for making financial decisions.

12. RESEARCH METHODOLOGY

Research Design:

A Descriptive Research Design has been adopted and a Survey Method have been used.

Survey method was careful used and a structured questionnaire was administered through personal contact method to employees of My Home Industries. The instrument is a self- completion questionnaire delivered to the respondents personally by the researcher.

Sources of Data collection

Primary Data

Primary data was collected from the employees of My Home Industries.

Secondary Data

The secondary data sources encompassed.

- Available research work in national and international journals
- Data existing on websites
- Text literature work, magazines & newspapers.

Sampling Plan:

Sampling Method

Stratified sampling method and convenient sampling method were used.

Population comprised of total number of employees working in My Home Industries, 9th Floor, 3rd Block, My Home Hub, Hitech City Road, Hitech City, Hyderabad, Telangana 500081.

Sample size

50 Employees were randomly selected from different departments of the firmsout of which 42 responses were received completely filled.

Period of Study:

The primary data was collected during 6-month period from Jan 2016 to May 2016.

Survey Instrument

The survey instrument is a questionnaire consisting of 21questions. The questionnaire consisted of dichotomous and multiple-choice questions.

Study Area

This study was conducted in My Home Industries9th Floor, 3rd Block, My Home Hub, Hitech City Road, Hitech City, Hyderabad, Telangana 500081.

Participants

Respondents were the employees of the My Home Industries

Hypothesis:

H0: There is no positive & significantcorrelation between Monetary inclusion and financial performance of companies in the construction sector of Hyderabad.

13. REVIEW OF LITERATURE

Research Evidence on Access to Finance and Financial Inclusion:

Economic Access is described for the reason that "absence of cost in addition to non-price barriers in buy to financing". (Demirguc-Kunt since well as Levine, 2009). It has already recently been a subject of concern for world economies since it forms a part of economic development with various amount research done inside in an attempt to be able to value the connection in between entry to finance in addition to economic development (Demirgüç-Kunt since well as Maksimovic, 1998). However, in the location of your time, analysis started out in buy to give attention to be able to use of financial and their effect on companies. Coming from that, some research put together data from businesses together with macro- economic signals comprising across various nations (Beck, Demirguc-Kunt, as well since Maksimovic, 2008). Whilst other folks started out to consider country-specific and looked over the corporation between financial access as well as financial development using firm-level data (Du as properly as Girma, 2007). Inside most these research, that evident that firms' efficiency and growth gives a better use the particular wellbeing of economies. This is usually undoubtedly that will several countries, mostly created nations around the world fare much much better regarding this than developing types which Africa is no exclusion. With respects to monetary development, many studies have demonstrated that this African region severely lags behind (Fowowe and Abidoye, 2013; Allen et al., 2012; Fowowe, 2017). For this reason more study must be done with regards to the African continent in purchase to understand and provide room for effective guidelines that enhance the performance regarding firms. Institutions just like the Planet Firm have made different enquires into financial accessibility across nations both produced and developing. In 08, the World Firm record acknowledged that fewer as compared to half the populace inside developing countries has accessibility to finance. This deficit is not only knowledgeable by individuals but organizations at the same time. Evidence approaching from Demirgüç-Kunt along with Klapper (2012), in their International Findex Database, was of which option of funds was described by most SMEs inside of Africa being a significant limitation. Inside the analysis relating to 130000 organizations in 127 countries from Enterprise Overview Data set, the document also admits that companies in Africa have little access to external cash with only 22% regarding organizations according to their particular survey have access to be able to loans and lines regarding credit for business. More properly been done to be able to delve deeper into typically the conundrum of the Photography equipment continent.

. **Theories on Financial Inclusion**

Financial Growth Perspective:

Sagesse on the financial progress claim that financial development creates a productive atmosphere regarding growth through the supply push (financial development since a catalytic agent together with regard to growth) or perhaps demand-pull impact (growth, inside turn, induces greater requirement for monetary products) (World Firm, 2008). These principles as nicely remark across the absence associated with accessibility to finance like the perilous issue answerable with regard to that obstinate gap within the particular income of the particular wealthy and poor because nicely since the lag inside economic growth.

Financial Intermediation Perspective:

Another theory underpinning financial launch in the financial intermediation theory. Here financial institutions as well as for that make the difference, the financial support of which they provide is observed a method in order to attach surplus spenders in order to be able to debt units inside a great affordable space (Ndebbio, 2014). This particular, therefore, suggests of which usually economies which is often more financially inclusive are that have lately been able to an improved extent establish this partnership between deficit devices in addition the surplus units. Usually the theory also states of which financial organizations are inside an enhanced position in order to help monetary inclusion or in some other words that they are usually in a position in order to monitor borrowers regarding money more appropriately thereby protect surplus spending devices through the greater credit ranking risk which allows these types of sorts of units to create their particular surplus money available. Diamonds (1984) states that that is with regard to this purpose that traders will take into accounts purchasing the secondary expense decision financial assets through these sorts of intermediaries and are offering with regard to the service costs charged instead of just provide the monies directly within order to the debt units. The particular concept of financial intermediations furthermore suggests that business proprietors, who may otherwise water the primary city to account their own projects may do so simply by virtue of financial inclusion that comes from monetary

organizations. Inside a bid within order to earn earnings for that particular going issue of financial institutions, they research out numerous investment possibilities which might have great possible

ResearchEvidence on the Construction industry and Project Finance

"The construction sector, like producing or manufacturing, follows typically the pattern of change that may reflects a country's amount of development" (Strassmann, 1970). The expansion sector as we know usually has a active variety of activities offering facilities for residential, business plus recreational purposes in between other people. The industry has its own associates with other sectors coming from the economy like producing utilizing labor, energy, substance, plus finance (Construct Hyderabad, 2018). Project financing may be referred to as by using a mostly collateralized or minimal collateral monetary structure wherever debt useful to finance typically the scheme is refunded coming from the cash inflows developed by the project alone. Research in project financing and performance of Structure companies is very minimal despite its immense share to world economies (B. Esty plus Megginson, 2001). However, most of the has recently been headway inside empirical analysis that unearths the significance of typically the structure sector and economic progress. Some appropriately exhibited a new duality with their relationship wherever construction industry performance has an result on the GDP of typically the country which in switch impact the performance of organizations inside the construction sector (De Long plus Summers D. H, 1991). To put to this, despite the fact that there are a dual association in between the construction sector plus the economy, that is, typically the influence of GROSS HOME-BASED PRODUCT on construction being a new whole sector is usually inside short run wherever the GDP of a new great economy provides first enhance that for companies inside that sector. Inside the long term, generally the construction sector ignites monetary growth forward by means of aide with other areas in addition to job (Dakhil, 2013). That is usually unparalleled to point out there, given empirical evidence, regarding which the development sector is usually actually a poignant share to GROSS DOMESTIC MERCHANDISE (Green, 1997; Hillebrandt, 2150; Lean, 2001; Rameezdeen, 2007).

Variables for access to be able to finance and financial introduction

Among the particular other constraints of the company environment, those that is going to be classified under access in order to finance are the Credit score Constrained Status (CCS), Overdraft facilities and Credit collection. Credit Constrained Status will be a concept developed simply by Kuntchev, Ramalho, Rodriguez-Meza, and Yang (2013) who utilized Enterprise data set in order to construct 4 different subgroups as a means associated with estimating how credit-constrained companies are. These subgroups usually are Full Credit Restricted (FCC), Partially Credit Restricted (PCC),

Maybe Credit Restricted (MCC) and No Credit score Constrained (NCC). Kuntchevou 's (2013) determined of which often for a firm to be categorised as Overall Credit Constrained, it must be established that typically typically the firm has applied relating to credit and get flipped down with no additional way to obtain outside finance. They should also tumble under these varieties regarding criteria:

a. In loan products their seed money in addition to purchases in the prior yr the firm performed not necessarily use virtually any external financing.

b. Typically the firm does indeed not have got any excellent loan that has been disbanded during the prior money year or virtually any time frame after as from typically the time typically the questionnaire will be accomplished

c. Applied regarding credit rating during the prior yr.

Firms that tumble beneath the category regarding PCC are businesses which may have already been able to obtain extra causes of external financing. These types of businesses should likewise:

the. Have used an origin associated with finance to be capable to fund investments produced and/ or for operating money inside the previous year

b. Not need utilized with regard to any external mortgage with regard to any reason apart through the reason of having enough money

c. Used for credit together been rejected in the previous yr

For businesses under typically the category of MCC, they may have access to external financing.

a. Used external supply of finance for functioning capital and/or have a very financial loan outstanding as on the prior year

b. Sent applications for a new loan in the prior

Finally, for businesses classified under the NCC, no matter of their present amount of external funds, they usually are truly satisfied with their particular present financing structure regarding both seed money and investment decision. The group, consequently, consists of businesses that:

a. Performed not request for virtually any loan from any lender or financial institution in the course of the preceding year.
m. The cause of not necessarily obtaining a loan had been they being sound economically.

6. Results and Discussion

Descriptive Statistics

Financial Inclusion Variables

Table 4.1 Descriptive Statistics of Financial Inclusion Variables

OVERDRAFT		*CREDIT LINE*		*CCS*	
Mean	0.5714	Mean	0.5238	Mean	2.9286
Standard Error	0.0773	Standard Error	0.0780	Standard Error	0.1462
Median	1	Median	1	Median	3
Mode	1	Mode	1	Mode	3
Standard Deviation	0.5009	Standard Deviation	0.5055	Standard Deviation	0.9472
Sample Variance	0.2509	Sample Variance	0.2555	Sample Variance	0.8972
Kurtosis	-2.0084	Kurtosis	-2.0923	Kurtosis	-0.4822
Skewness	-0.2995	Skewness	-0.0989	Skewness	-0.5756
Range	1	Range	1	Range	3
Minimum	0	Minimum	0	Minimum	1
Maximum	1	Maximum	1	Maximum	4
Sum	24	Sum	22	Sum	123
Count	42	Count	42	Count	42

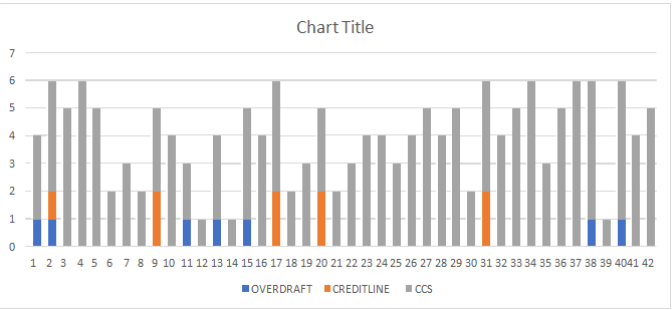

Figure 4.1. Chart for Financial Inclusion Variables

Pertaining to the variables of financial inclusion which were in the form of Credit score Constrained Status (CCS), Overdraft and Credit Line. The particular descriptive summary as for each the data collated arrived as shown in the table.

From Table 4. 1, it was observed that on average the Credit Constrained standing from the construction firm within Hyderabad is 2.9286. This indicates that around the Kuntchevainsique al (2013) ordinal level for assessing the credit-constrained status of firms, businesses in the construction field of Hyderabad, fell under the group of Maybe Credit Constraint(Category 3). This ensures that normally, businesses within the industry buy some type of outside options for funds within typically the past financial year. They could have also considered implementing for credit within typically the financial year. This is certainly more corroborated with the modal CCS status of three or more as well as the median. For both Overdraft in addition to Line of credit usage, structure businesses experienced usage of these sorts of economic services. There is normally a good implication that also although construction businesses usually are usually not fully free arriving from credit constraints, they could have utilization of credit lines in addition to overdraft facilities and about average, show greater ranges of financial inclusion all together. As confirmed in 4. 1, the many of the businesses appear to be to prefer typically the long-term financial options as opposed to the short-term as noticed in the levels of CCS (which represent typical company loans) and Credit Line facilities.

4.1 Control Variables

Table 4.2. Descriptive Statistics of Control Variables

SIZE OF FIRM		*AGE OF FIRM*		*REGULATIONS*	
Mean	26.5238	Mean	11.5476	Mean	3.4524
Standard Error	2.4014	Standard Error	0.7406	Standard Error	0.1777
Median	25	Median	11.5	Median	3
Mode	20	Mode	15	Mode	3
Standard Deviation	15.5630	Standard Deviation	4.7994	Standard Deviation	1.1519
Sample Variance	242.2067	Sample Variance	23.0343	Sample Variance	1.3269
Kurtosis	-0.5272	Kurtosis	0.5417	Kurtosis	-1.4163
Skewness	0.3599	Skewness	0.6631	Skewness	0.1219
Range	58	Range	22	Range	3
Minimum	4	Minimum	4	Minimum	2
Maximum	62	Maximum	26	Maximum	5
Sum	1114	Sum	485	Sum	145
Count	42	Count	42	Count	42

Fowowe (2017) identifies in their study determined that businesses which were older in age group tend to have greater financial addition. As seen in table 4. 2, organizations inside the construction sector regarding Hyderabad have a mean age of about 11.54 years which can propose of which the industry is actually a comparatively mature one which may possibly propose why overall, organizations in the construction industry gain access to loan facilities (CCS) along with overdraft and credit rating line services. It is also worth noting the

variable size which had been dependent on the number regarding staff which was utilized by the firm recently had anmean of about 27 people. The firm together with the highest number got 62 plus the minimum had been 4. Regarding regulations coming from government or by regulation, on average, organizations were required to conform to 3 major regulations. Dependent Variable:

Table 4.3. Descriptive Statistics of Dependent Variable

Financial Performance	Values
Mean	8.8571
Standard Error	0.9199
Median	8
Mode	3
Standard Deviation	5.9615
Sample Variance	35.5401
Kurtosis	-0.5733
Skewness	0.5484
Range	22
Minimum	0
Maximum	22
Sum	372
Count	42

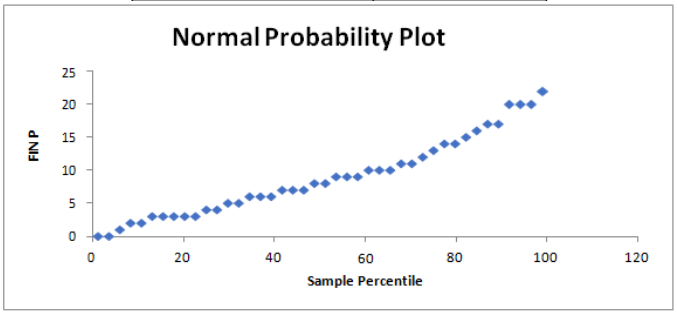

Figure 4.2. Normality Plot of Financial Performance

The particular dependent variable for this particular study adopted a proxy server for performance and development which was employed by (Delmar, Davidsson, as well as Gartner, 2003; Davidsson, Leona, as well as Naldi, 2010). The financial performance associated with the businesses in the particular sector had an typical of about 9. These types of were spread across the particular number of projects initiated within the past monetary year, the number associated with projects initiated within the previous financial year and as well. The particular maximum performance of the firm in this discipline given the proxy provides been 22 whiles number of businesses had now efficiency outputs. And stick to be able to normal submission as tested in Determine 4. a couple of even although the based mostly variable is very a web proxy. The proxy suggests of which the performance average related with businesses in typically the building sector is comparatively reduced with an average connected with about 9 per twelve months. This hints to typically the particular observation created by simply Annamalai along with Jain (2013) that came up with the performance regarding the particular construction industry of building countries usually are considerably reduce than regarding building countries. Correlation and Regression

Correlation between independent variables and dependent variables.

Correlation of Variables

Table 4.4 Correlation of Variables

	OVERDRAFT	*CREDIT LINE*	*CCS*	*SIZE*	*AGE*	*REGULATION*	*FIN P*
OVERDRAFT	1						
CREDIT LINE Sig. (2-tailed)	0.2340 0.000	1					
CCS Sig. (2-tailed)	0.4994 0.000	0.3347 0.000	1				
SIZE Sig. (2-tailed)	-0.0644 0.000	0.0790 0.000	0.1201 0.000	1			
AGE Sig. (2-tailed)	0.3131 0.000	0.0699 0.000	0.0947 0.000	-0.0307 0.000	1		
REGULATION Sig. (2-tailed)	-0.3744 0.000	-0.1656 0.000	-0.5732 0.000	0.1538 0.000	-0.1518 0.000	1	
FIN PERF	0.5671 0.000	0.3977 0.000	**0.8015** 0.000	-0.0520 0.000	0.0463 0.000	-0.7540 0.000	1

Table 4. 4 shows the direction and the relation with each other of both the dependent variable i.e. Financial Performance and independent variables i.e. Overdraft, Credit Line, CCS, Size of Firm, Age of Firm and Regulation. From the table, it can be noticed that all the variables except Size of Firm and Regulationare positively correlated with each other indicating that the independent variables are influencing others in positive direction & are statistically significant. Size of Firm and Regulation shows a significant negative correlation with financial performance. The above findings indicate that with the improvement of independent variables, there

will be a significant improvement in financial performance.

On further observations the results show that there is positive & significant correlation between performance & the independent variables–where CCS yielded a correlation coefficient (r= 0.8015, p= .000) followed by OVERDRAFT (r= 0.5671, p= .000), CREDIT LINE (r= 0.3977, p= .000). Whereas a negative correlation is found with Size of Firm (r= -0.0520, p= .000) & Regulation (-0.7540, p= .000) is found to be significant.

In order to examine the influence of independent variables in the prediction of financial performance a multiple regression analysis approach was used, where the predictive power of each independent variables relating to dependent variable can be obtained.

Table 4.5. Summary Output of Regression Model

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.9111
R Square	0.8301
Adjusted R Square	0.8010
Standard Error	2.6595
Observations	42

It is evident from the table that except Size of Firm and Regulation, all the independent variables in combination yielded a positive correlation coefficient (R=0.9111 P=.000). This indicates that most of the independent variables are significant predictors of the financial performance.Further observations of the results presented in the table shows that the coefficient of determination R Square is 0.8301which is statistically significant. This indicates that all the independent variables have accounted for 83 percent of change in financial performance.

Table 4.7. Coefficients and P-values of Independent Variables.

	Standard Error	*Coefficients*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	8.6143	3.0241	2.8486	**0.0073**	2.4751	14.7536
OVERDRAFT	2.3706	1.0210	2.3219	**0.0262**	0.2979	4.4433
CREDITLINE	1.7792	0.8768	2.0293	**0.0500**	-0.0007	3.5592
CCS	2.6811	0.6215	4.3141	**0.0001**	1.4194	3.9427
SIZE	-0.0157	0.0282	-0.5590	0.5797	-0.0729	0.0414
AGE	0.1647	0.0918	1.7945	0.0814	0.3510	0.0216
REGULATION	-2.1945	0.4614	-4.7559	**0.0000**	-3.1312	1.2578

Coming from Table 4. 5, typically the summary output of typically the regression shows that typically the independent variables that usually are OVERDRAFT, CREDIT LINE, CREDIT RATING CONSTRAINED STATUS (CCS), SIZING, AGE, and REGULATION affect a change of about 83% on the dependent variable FINANCIAL EFFICIENCY (FIN P). This implies that the model is usually well fit.

Hypothesis Testing:

Therefore, the results presented in the table of correlation & regression provide a strong support for rejection of null hypothesis which states that there is no positive & significant correlation between perceived financial Performance& the independent variables related to financial inclusion.

14. FINDINGS

- Many of the businesses appear to be to prefer typically the long-term financial options as opposed to the short-term as noticed in the levels of CCS (which represent typical company loans) and Credit Line facilities.
- Regarding regulations coming from government or by regulation, on average, organizations were required to conform to major regulations.
- All the variables except Size of Firm and Regulation are positively correlated with each other indicating that the independent variables are influencing others in positive direction & are statistically significant.
- Size of Firm and Regulation shows a significant negative correlation with financial performance.
- The above findings indicate that with the improvement of independent variables, there will be a significant improvement in financial performance.
- Most of the independent variables are significant predictors of the financial performance. The coefficient of determination R Square is 0.8301which is statistically significant. This indicates that all the independent variables have accounted for 83 percent of change in financial performance.
-

15. CONCLUSION

From your data analyses above it might seem to be that the monetary inclusion levels of building businesses are pretty enough however they still have higher factors of credit restrictions which may hamper their own performance. It has furthermore been established that increased levels of financial addition may cause higher overall performance between businesses within the building sector. Although long-term monetary options will seem to be a lot more favourable in assessment to temporary financial deals like an overdraft.

With regard to firms, this suggests within the pursuit of their own projects it will be beneficial to look out for long-term sources of funds as opposed to those in the shorter term. Also, it is a worthy point to note that constraints from these financial packages will have a negative implication on their performance and so they would have to be circumspect when seeking out these financial options being provided by the financial institutions.

16. SUGGESTIONS AND RECOMMENDATIONS

From the research increasing the amounts of financial inclusion greatly advantages the financial performance efficiency levels. One more thing typically the study concluded appears to be typically the inference of tax in inclusion to financial regulation inside the organizations in the building industry.

Heavy regulations appear paying a heavy cost about the performance associated with organizations in the sector in addition to so the government may have to be innovative in its tax regulations.

Project Future Cash Flow, by taking advantage of cash flow management software, a construction company still will have an opportunity to gain a general idea about what income and expenses should be expected in the future. Proper planning in anticipation of these events will help prevent payroll and payment problems.

Approach Payroll Correctly as in construction company, employees are almost always paid on a bi-weekly basis. To improve cash flow, subcontractors can be hired, which are paid every four weeks. This should only be done in special situations, however, as you'll get higher-quality results from permanent, full-time employees – and that higher-quality work reduces the odds of accidents and project setbacks and increases the likelihood of repeat business.

By accepting electronic payments, money will be received faster, increasing cash flow and allowing for more capital to be used for day-to-day operations, payables, and growth.

Train the Project Manager on Cash Flow Management as in construction, 85% of cash comes from project work in progress, which means cash flow performance depends on the project manager's cash flow management. In addition to training, you can offer an incentive-based on cash flow performance. This is likely to be effective.

Aside from having the right project management, a construction company should do everything in its power to increase the speed of receivables, which will improve cash flow.

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