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EARLY HEART DISEASE PREDICTION BY TAKING PRIOR ACTION BY USING MACHINE LEARNING

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ABSTRACT

Nowadays, health diseases are increasing day by day because of lifestyle, hereditary. Especially, heart condition has become more common lately. i.e. The lifetime of an individual is in peril. Each individual has different values for vital signs, cholesterol, and pulse. But consistent with medically proven results the traditional values of vital sign is 120/90, cholesterol is and pulse is 72 during this project we'll analyze about the various classification techniques used for predicting the danger level of every person supported age, gender, vital sign, cholesterol, pulse**.**

1 INTRODUCTION

The term "heart disease" is typically used interchangeably with the term "cardiovascular disease". heart condition generally refers to conditions that involve narrowed or blocked blood vessels which will cause an attack, pain (angina) or stroke.Other heart conditions, such as those that affect your heart's muscle, valves or rhythm, also are considered sorts of heart conditions. Many sorts of heart conditions are often prevented or treated with healthy lifestyle choices. Cardiovascular disorder symptoms could also be different for men and ladies. For example, men are more likely to possess chest pain; women are more likely to possess other symptoms alongside chest discomfort, like shortness of breath, nausea and extreme fatigue.

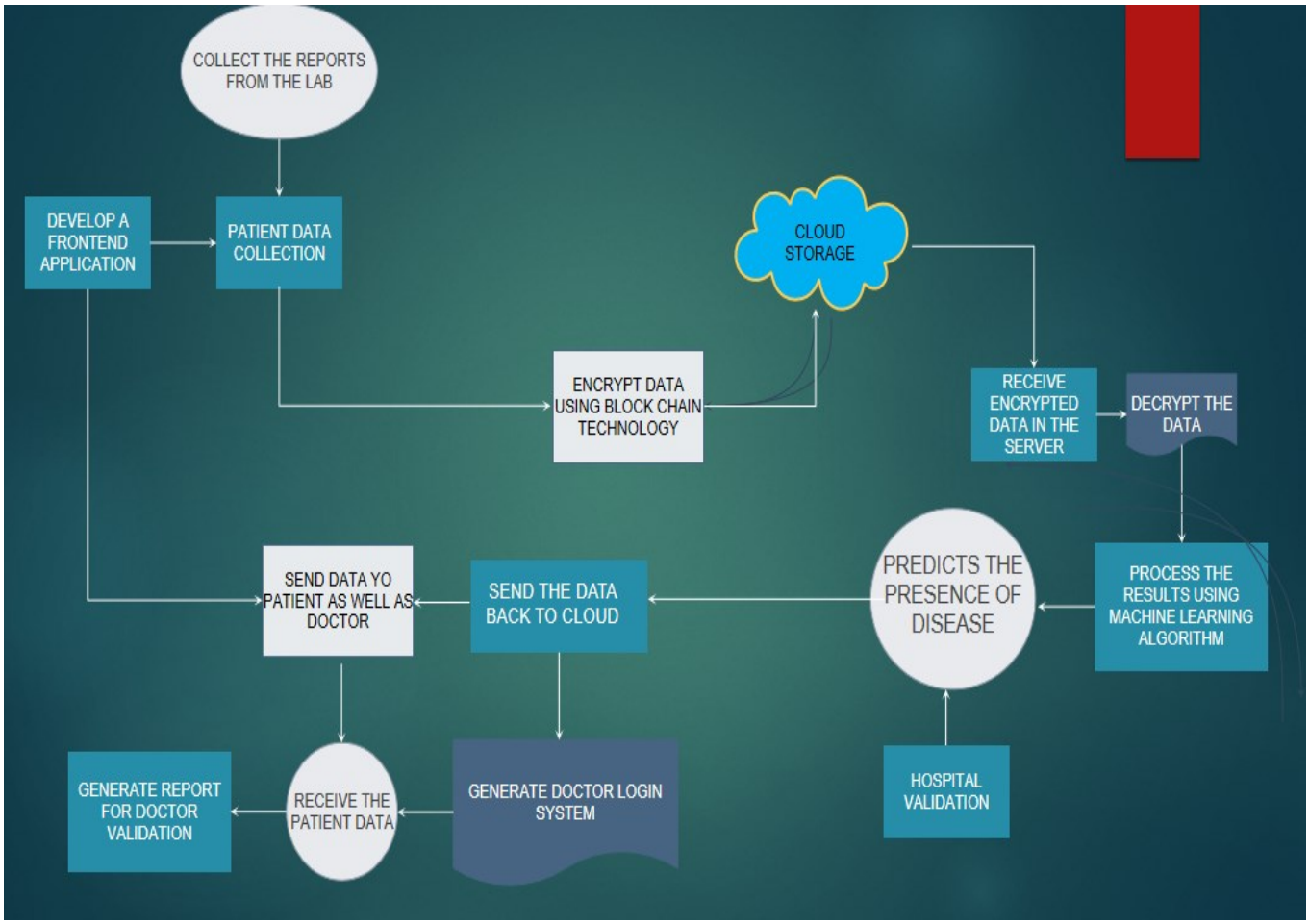
Keywords: Heart disease, machine learning, block chain

AEXISTING SYSTEM

In the existing system, only the temperature of the patient as well as the heart breathing frequency is determined. .An authorized searchable encryption scheme under a multi-authority setting. The proposed scheme leverages the RSA function to enable each authority to limit the search capability of different clients based on clients' privileges. To enhance scalability, multi-authority attribute-based encryption is utilized to allow the authorization process to be performed on just one occasion even over policies from multiple authorities.

B PROPOSED SYSTEM

In this paper, I will be able to be designing an efficient heart condition prediction system using machine learning technology where three different algorithms are compared to prove the absolute best efficient algorithm. A block chain-based medical data security system is proposed with an ACP approach. An efficient asymmetric encryption like cryptographic cipher also as block chain security like SHA-256 is proposed to secure the info in storage, during transmission and disease prediction on the server-side.A Django framework for the patient is developed where the patient can enter the data for disease presence prediction without visiting the doctor.



II IMPLEMENTATION

The objective of the project is to present a machine learning approach for the prediction of heart disease severity based solely on different health parameters. To predict the disease possibility without the necessity for an upscale doctor. A frontend page development for data entry of the patient to show a real-time evaluation. To secure data using block chain encryption and decryption. To help take prior actions and save the life of the people at an early stage.

1Patient module

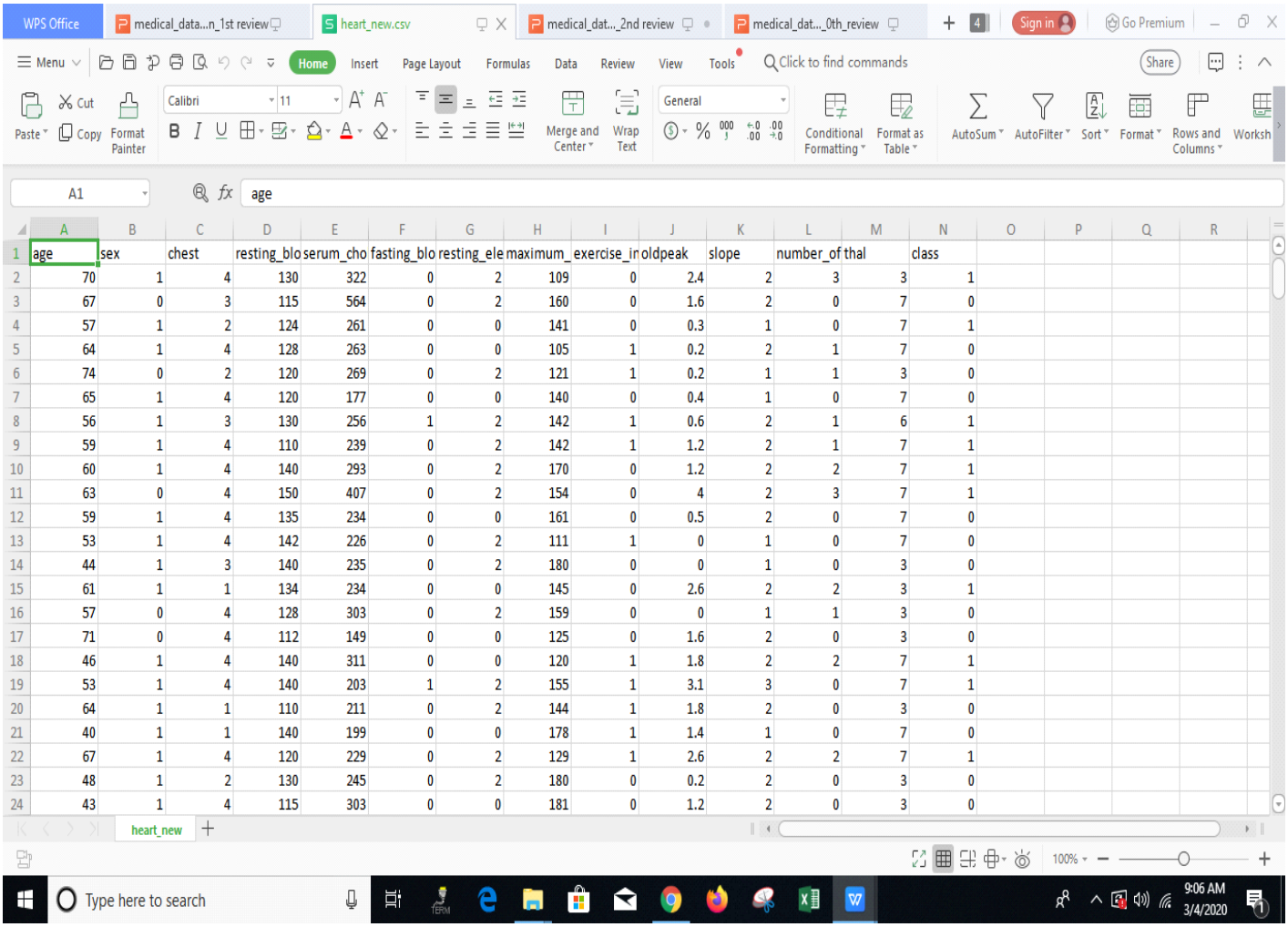
The patient inserts the info collected from the test reports into the login. The patient inserts the info collected from the test reports into the login.The Advanced Encryption Standard, or AES, is a symmetric block cipher that is employed here.

2 Hospital modules

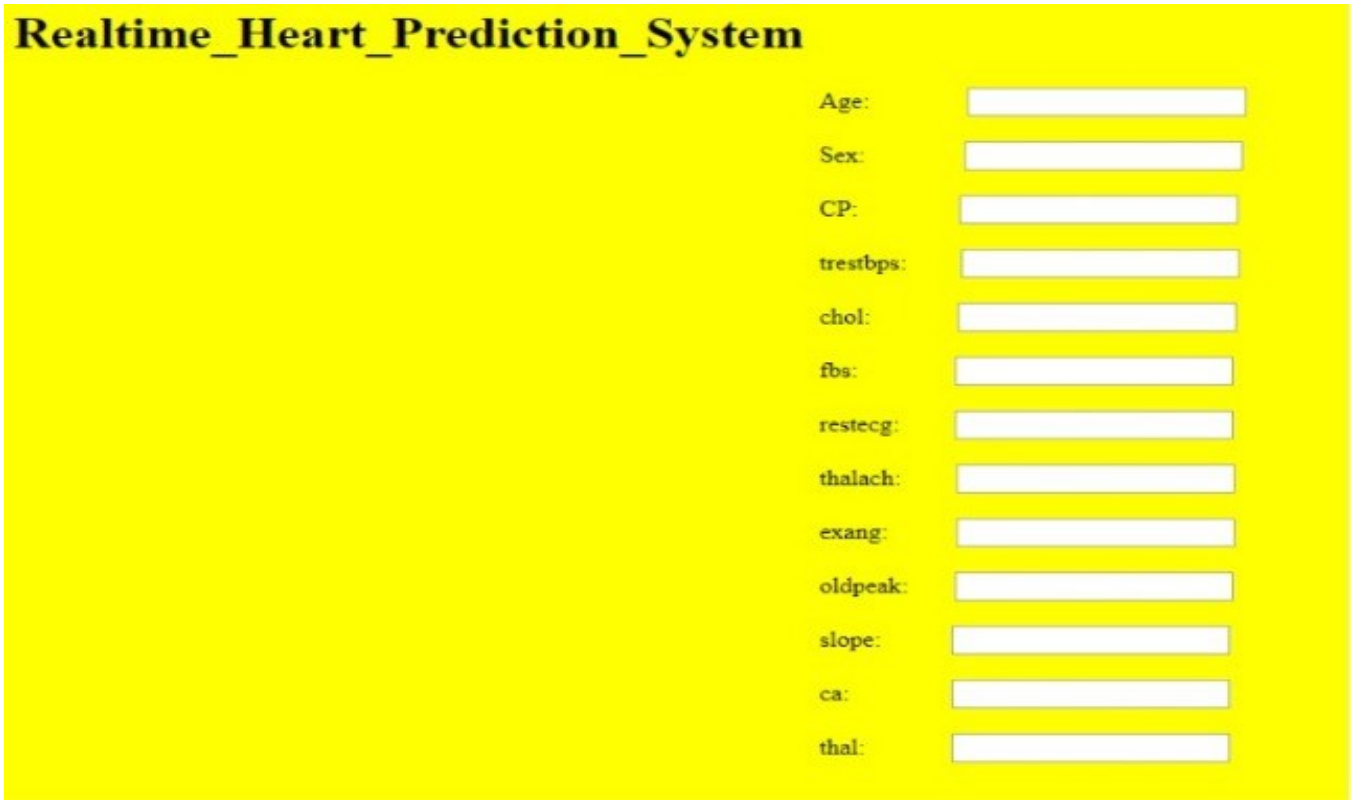
The data from the patient is transmitted to the hospital. The process of decryption of an AES ciphertext is similar to the encryption process to the reverse order.The patient data is analyzed using a machine learning algorithm and a report is prepared and transferred to the cloud. In the Hospital side, we will receive the data and decrypt it using the AES decryption.

3 Doctor Modules

A separate application login is prepared for the doctor from which he can access the reports of the patients and analyze it. The AES decryption is been performed to decrypt the data transferred from the hospital module.Then he can view using his login details about the patient's condition and take necessary steps whenever needed.



age	sex	chest	resting_blo	serum_cho	fasting_blo	resting_ele	maximum_	exercise_in	oldpeak	slope	number_of	thal	class
70	1	4	130	322	0	2	109	0	2.4	2	3	3	1
67	0	3	115	564	0	2	160	0	1.6	2	0	7	0
57	1	2	124	261	0	0	141	0	0.3	1	0	7	1
64	1	4	128	263	0	0	105	1	0.2	2	1	7	0
74	0	2	120	269	0	2	121	1	0.2	1	1	3	0
65	1	4	120	177	0	0	140	0	0.4	1	0	7	0
56	1	3	130	256	1	2	142	1	0.6	2	1	6	1
59	1	4	110	239	0	2	142	1	1.2	2	1	7	1
60	1	4	140	293	0	2	170	0	1.2	2	2	7	1
63	0	4	150	407	0	2	154	0	4	2	3	7	1
59	1	4	135	234	0	0	161	0	0.5	2	0	7	0
53	1	4	142	226	0	2	111	1	0	1	0	7	0
44	1	3	140	235	0	2	180	0	0	1	0	3	0
61	1	1	134	234	0	0	145	0	2.6	2	2	3	1
57	0	4	128	303	0	2	159	0	0	1	1	3	0
71	0	4	112	149	0	0	125	0	1.6	2	0	3	0
46	1	4	140	311	0	0	120	1	1.8	2	2	7	1
53	1	4	140	203	1	2	155	1	3.1	3	0	7	1
64	1	1	110	211	0	2	144	1	1.8	2	0	3	0
40	1	1	140	199	0	0	178	1	1.4	1	0	7	0
67	1	4	120	229	0	2	129	1	2.6	2	2	7	1
48	1	2	130	245	0	2	180	0	0.2	2	0	3	0
43	1	4	115	303	0	0	181	0	1.2	2	0	3	0



HEART DISEASE FREQUENCY FOR AGES

Patients from age 29 to 79 are selected in this dataset for Male patients are denoted by a gender value 1 and feminine patients are denoted by gender value 0. Four sorts of chest pain can be considered as indicative of heart disease. Type 1 angina is caused by reduced blood flow to the heart muscles because of narrowed coronary arteries. Type 1 Angina is a chest pain that occurs during mental or emotional stress. Non-angina chest pain may be caused due to various reasons and may not often be due to actual heart disease. The fourth type, Asymptomatic, may not be a symptom of heart disease. The next attribute trestbps is the reading of the resting blood pressure. Chol is the cholesterol level. FBS is the fasting blood sugar level; the value is assigned as 1 if the fasting blood sugar is below 120 mg/dl and 0 if it is above. Restecg is the resting electrocardiographic result, thalach is the maximum heart rate, exang is the exercise-induced angina which is recorded as 1 if there is pain and 0 if there is no pain, old peak is the ST depression induced by exercise, slope is the slope of the peak exercise ST segment, ca is the number of major vessels colored by fluoroscopy, thal is the duration of the exercise test in minutes, and num is the class attribute. The class attribute has a value of 0 for normal and 1 for patients diagnosed with heart disease.

SVM ALGORITHM ACCURACY

```
#clf.fit(x,y)
clf.fit(X_train,Y_train)
```

```
C:\Users\User\Anaconda3\lib\site-packages\sklearn\utils\validation.py:761: DataConversionWarning: A column-vector y was passed
when a 1d array was expected. Please change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

```
SVC(C=1.0, cache_size=200, class_weight=None, coef0=0.0,
  decision_function_shape='ovr', degree=3, gamma='auto_deprecated',
  kernel='linear', max_iter=-1, probability=False, random_state=None,
  shrinking=True, tol=0.001, verbose=False)
```

```
#STEP 6 & 7  : Accuaracy and Prediction

from sklearn.metrics import roc_auc_score
predictions=clf.predict(X_test)

print(predictions)
print()
print ("AUC:",roc_auc_score(Y_test,predictions))
```

```
[0 1 0 0 0 0 0 0 0 0 1 1 0 1 1 1 0 1 0 0 1 1 0 0 1 0 0 0 1 1 1 0 1 1 1 0 0
 1 0 0 1 1 0 0 1 1 1 1 0 1 1 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 0 0 0 1 0 1 1 0
 1 1]

AUC: 0.8241719520789288
```

SVC ALGORITHM ACCURACY

```
when a 1d array was expected. Please change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

```
Y_pred = regressor.predict(X_test)
Y_pred
```

```
array([0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 0, 1, 1,
       0, 0, 1, 0, 0, 0, 1, 1, 1, 0, 1, 1, 1, 0, 0, 1, 0, 0, 1, 1, 0, 0,
       1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       0, 0, 0, 1, 0, 1, 1, 0, 1, 1], dtype=int64)
```

```
from sklearn.metrics import roc_auc_score
from sklearn.metrics import roc_curve
from matplotlib import pyplot
aucry=roc_auc_score(Y_test,Y_pred)

print("ACC:",aucry)
probs = regressor.predict_proba(X_test)
# keep probabilities for the positive outcome only
probs = probs[:, 1]
```

```
ACC: 0.8241719520789288
```

LOGISITIC REGRESSONACCURACY

```
auc = roc_auc_score(Y_test, probs)
print('AUC: %.3f' % auc)
# calculate roc curve
fpr, tpr, thresholds = roc_curve(Y_test, probs)
# plot no skill
pyplot.plot([0, 1], [0, 1], linestyle='--')
# plot the roc curve for the model
pyplot.plot(fpr, tpr)
# show the plot
pyplot.show()
```

```
C:\Users\User\Anaconda3\lib\site-packages\sklearn\utils\validation.py:761: DataConversionWarning: A column-vector y was passed
when a 1d array was expected. Please change the shape of y to (n_samples, ), for example using ravel().
  y = column_or_1d(y, warn=True)
```

```
AUC: 0.943
```

CONCLUSION

This paper is going to be useful in identifying patients who may suffer from heart disease within the next 10 years. It will try to avoid the likelihood of heart condition for the patients. This heart disease prediction can be done by using various machine learning algorithms.

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