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STUDY OF WHEAT ANALYSIS USING IMAGE PROCESSING TECHNIQUES

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Abstract- The appearance of wheat such as its shape and color is expected to be of important reference value in agricultural breeding and quality testing. Aiming at an objective of accurate analysis of wheat appearance quality, this process involves transform the original wheat images into binary images where wheat seed is labeled subsequently to extract parameters with the motivation of developing a fully automatic grain type and variety identification system. There are various proposed methods based on analysis using different methods and processes.

Keywords- **Wheat seeds, Image processing, Quality**

1.0 Introduction

Seed analysis and classification are made to obtain information about seed type, variety, quality and the production. Pure, disease-free and insect-free seeds can be defined as quality seeds. Determination of the type, variety and quality of seeds, is necessary for certification procedures. And also, it is the first step of the seed processing operation in the seed separation machines.

Use of certified seeds, increases the quality and quantity of yield. Typically, for the certification, the analysis and classification process are made by experts using visual characteristics of the seeds. These conventional methods are very time consuming, very tedious, costly, and depend on the person. In the seed separation machines, the determination of the seed properties, identification of the seed type, varieties and identification of diseased and structural deformed seeds operations are performed. In the present seed processing machines, these processes used mechanical operations as well as optical, spectrographic and chromatographic methods based on knowledge of colors. In such machines, the seeds are processed one at the same time. In recent years, many applications in agriculture have been automated and use of image processing techniques became very important. Also, in this application the use of image processing according to other conventional methods has several important advantages. Systems can be designed as fully automatic. It would be an objective approach for real time identification of wheat varieties. Application is made without touching the seed, it does not cause any harm to them. Analysis speed is higher. There is no cost of the system other than the cost of the installation. Moreover, with such measurements, data correlation between the seed genetic characteristics, the development performance and yield can be provided.

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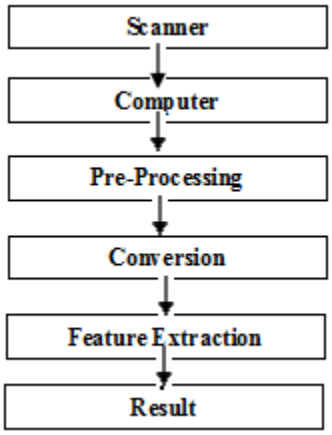
2.0 Methods

The basic process used in all techniques for analysis of the wheat seeds are the same. First, the image of the wheat seed grain is captured using a camera. Image is fed into computer for the further analysis. Then it is pre-processed for removing the noise present while capturing the image. This may use various filters such as mean filter, gaussian filter, median filter etc. After pre-processing it is then converted to a suitable form to binary or gray level image. The parameters are then extracted from the converted image using different processes. The processes may also depend on the specified parameter that is exactly needed. There are different techniques used for the processing of the image which are summarized in this paper.

Block diagram



3.0 Processing Techniques

1 Artificial Neural Network

It is one of the analysis technique which uses multi- layer perception by finding the number of neurons in the hidden layers.

2 Pseudo Color Imaging

Finding the color parameters by the process of filtering, segmentation by thresholding and labeling the region for mean, standard deviation, angular second moment and correlation inverse of different moment for determining the dissimilarity based on the moment.

3 Clustering Method

These are mainly used for the weed seed recognition by using the parameters such as rotation angle, scaling factor, translation invariance. It is done by the comparison of Euclidean distance and the Average distance.

4 RGB Histogram

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Three images are considered ie. original image, binary image, and the image with edge of the seed. The histogram of all the three images are compared for error and variation in the frequency of the individual histograms.

5. Terahertz Time Domain Spectroscopy

Uses reflecting terahertz wave for finding the frequency and time domain spectra of the seed embryo.

6. Scale-Invariant Feature Transform (SIFT)

SIFT transform includes scale-space extrema detection, key point localization and using the key point to compare it with the database and the test image.

7. Particle Image Processing

This technology uses corrosion expansion segmentation algorithm by using the particle erosion concept. Particle erosion gives the isolated particles from the nuclear for labelling different regions. The edges can also be found by Watershed Transform Algorithm

4.0 Conclusion

In this work, the various processing techniques for the analysis of wheat seeds are given. The method is the main objective for processing and is based on the algorithms used for obtaining the results. The study proves that most of the techniques deals with extracting the parameters based of different processes. The highly efficient algorithm is to be used in real time for determining the parameters most effectively.

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