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Rice Grain Type and Grading of Rice Grains using Image Processing

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***Abstract*: Many researches applied machine vision to estimate rice appearance quality inspection. There are various food varieties like rice, wheat, potato, soya bean and maze. The rice and wheat being commodity crops are important among all the grains. Rice is main food crops that all human consumes in all over the world, especially in Asian countries. It is primarily classified according to its grain shape, colour etc. In this, use of machine vision system for the grain classification and detect the grading of grain type. Machine vision has been used in a most application of grain classification to differentiate rice varieties based on special features such as shape, length, chalkiness, colour and internal damage of rice. RGB colour model, histogram, edge detection are some ways which have been used to differentiate and analysed the rice grains. In this paper also discussing and suggesting methods classify four varieties of rice and it also finds the percentage of purity of rice grains using the image processing technics based on several features such as grain colour and shape.**

***Keywords*: Image processing, rice grain, pixel area.**

1. Introduction

The quality of the world's most important staple food crop can be determined based on the shape size and texture of the grain. In India the ever increasing population losses in handling and processing and the increased expectation of food products of high quality and safety standards there is need for the growth of accurate fast and objective quality determination of food grains. Now days we are using the chemical methods for the identification of rice grain seed varieties and quality. The chemical method used also destructs the sample used and is also very time consuming method. On the other hand, the machine vision or the digital image processing is a non-destructive method, it is also very fast and cheap process compared to the chemical method. In the early days of machine vision application to grain quality evaluation, Lai et al. (1986) suggested some pattern recognition techniques for identifying and classifying cereal grains popup showing that "Person under stressful. In India the ever increasing population losses in handling and processing and the increased expectation of food products of high quality and safety standards there is need for the growth of accurate fast and objective quality determination of food grains. Now-a-days we are using the chemical methods for the identification of rice grain seed varieties and quality. The chemical method used also destructs the sample used and is also very time consuming method. On the other hand, the machine vision or the digital image processing is a non-destructive method, it is also very fast and cheap process compared to the chemical method. In the early days of machine vision application to grain quality evaluation, Lai et al. (1986) suggested some pattern recognition techniques for identifying and classifying cereal grains.

2. Objectives

- Grading of rice can effectively be done by using the image processing techniques.
- With our coding we can calculate that how pure is our sample.
- The setup used is also very common and easily available.
- This is also more accurate than the human visual inspection.
- All this leads to better quality in food processing by image processing.

3. Methodologies

Image Acquisition: Image Acquisition is a process of getting an input image for the process of automatic detection of grain type and quality using image processing.

Pre-Processing: Pre-processing is a common name for operations with images at the lowest level of abstraction both input and output are intensity images. The aim of pre-processing is an improvement of the image data that suppresses unwanted distortions or enhances some image features important for further processing.

Segmentation of face: In computer vision, image segmentation is the process of partitioning a digital image into multiple segments (sets of pixels, also known as super-pixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze.

Image segmentation is typically used to locate objects and boundaries (lines, curves, etc.) in images. More precisely,

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image segmentation is the process of assigning a label to every pixel in an image such that pixels with the same label share certain characteristics.

The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image (see edge detection). Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, or texture.

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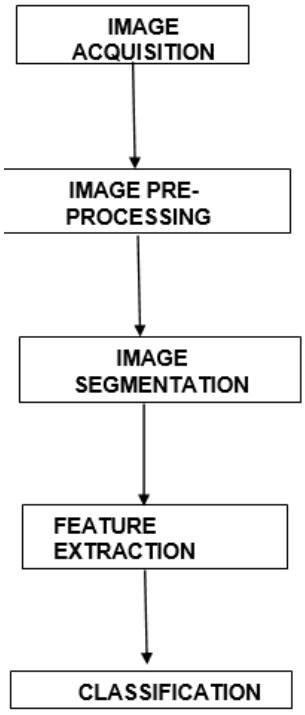

Fig. 1. Block diagram

Digital image processing is the use of computer algorithms to perform image processing into digital images. Image segmentation is very important and challenging process of image processing. Image segmentation is the techniques are used to partition an image into meaningful parts have similar features and properties. The aim of segmentation is simplification i.e. representing an image into meaningful and easily analyzable way. Image segmentation is the first step in image analysis.

The main goal of image segmentation is to divide an image into several parts/segments having similar features or attributes. The main applications of image segmentation are: Medical imaging, Content-based image retrieval, and Automatic traffic control systems, Object detection and Recognition Tasks, etc. The image segmentation can be classified into two basic types: Local segmentation (concerned with specific part or region of image) and Global segmentation (concerned with segmenting in whole image, consisting of large number of pixels). We use adaptive fuzzy c means Segmentation for extraction of grains.

4. Result

Fig. 2. Input image

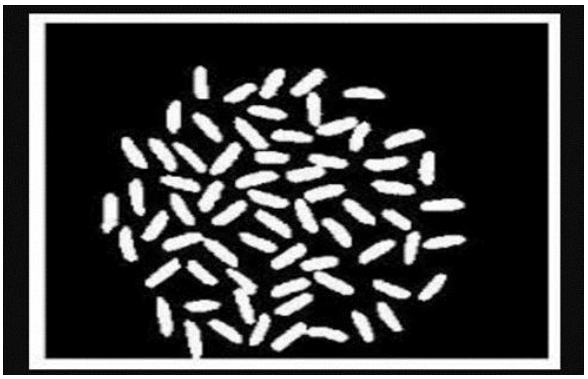

Fig. 3. Grayscale image

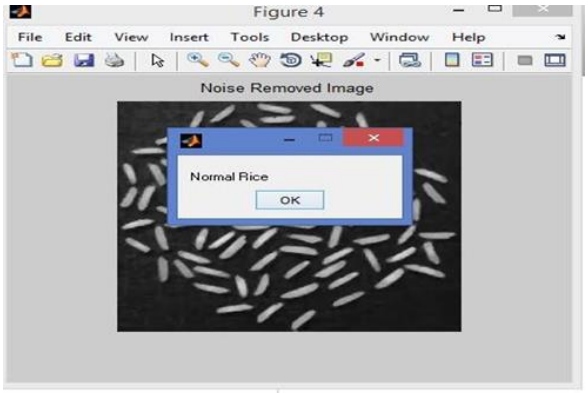

Fig. 4. Output image

Fig. 5. Input image

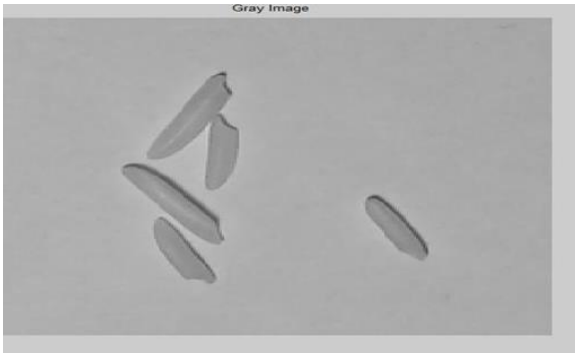

Fig. 6. Grayscale image

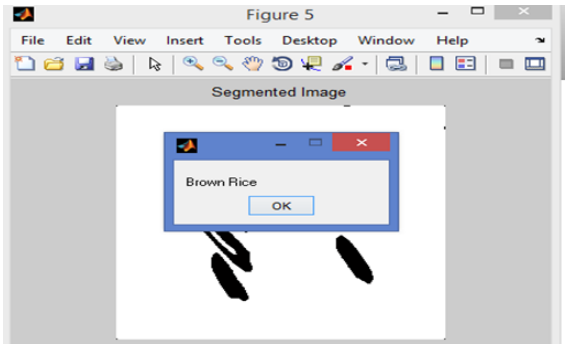

Fig. 7. Output image

5. Conclusion

Today's consumers are very quality conscious about the food grains they buy and consume as more and more adulteration in the food grains are reported in the media. In this paper an attempt is made to grading of rice grains based on morphological techniques using image processing. The image is initially subjected to pre- processing and the individual grains are segmented. The geometric features of the grain such as area, major axis length and the minor axis length are extracted and are subjected to classification The result are found to be encouraging. Based on the length of the grain the rice is graded.

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