A REVIEW ON IDENTIFICATION OF RICE GRAIN QUALITY USING MATLAB AND NEURAL NETWORK

MANSI KULKARNI

M.E Student, Electronics and Telecommunication Department, Deogiri Institute of Engineering and Management Studies, Aurangabad (M.S), India.

PROF. P. M. SONI

Professor, Electronics and Telecommunication Department, Deogiri Institute of Engineering and Management Studies, Aurangabad (M.S), India.

ABSTRACT

Quality of rice is mainly defined from its chemical & physical characteristics. Quality of rice grains sample is required for protecting the consumers from standard products because the samples of food materials are subjected to adulteration. In the present grain classification system, grain category and quality are rapidly assessed by visual inspection. This process is however, annoying and time consuming. The decision making capabilities of a grain inspector can be seriously affected by her/his physical condition such as eyesight and fatigue, mental state caused by biases and work pressure, and working conditions such as improper lighting, climate, etc. In This system we used Image processing and using this technique we can classify the rice grain sample with accuracy. The morphological features such as (area, perimeter, and length) extracted from the image and are given to Neural Network. This effort has been prepared to classify the appropriate quality of rice grain sample based on its parameters.

KEYWORDS: Grain quality, image processing, Morphological features, and neural network.

INTRODUCTION

Rice is essential food to life in India and it is available in many regions across India. India is the 2nd leading producer of rice in the entire world, followed by China. For about 65% of the people living in India, rice is a staple food for them. Rice is first mentioned in the Veda's. In India, there is a saying that grains of rice should be like two brothers. Rice is directly associated with fertility. Therefore there is the custom of throwing rice at weddings. Rice is the most important grain sample with regard to human nutrition and calorie intake, providing one fifth of the calories consumed worldwide by the human species. India is enforcing the use of rice standards to ensure that producers get paid maximum value for grain according to the quality for the grain. The analysis of rice grain type and their quality increased expectation of food products of high quality. Because of this there is need for growth of accurate, rapid and the main purposed is to quality determination of food grains sample. The quality of the world's most important staple food crop can be determined on the texture, shape, size of the grain sample.

Grain quality is a term that refers to the quality of grain sample. However, what constitutes quality depends on the use of the rice grain sample. Overall quality of rice grain are affected by several factors which includes, growing practices, time and type of harvesting, handling, storage management and transportation practices. Grain classification and specification system assures that a particular lot of grain meets the required set standards customer. In many countries classification of grain depends on three main properties (i) moisture contents (ii) test weight (iii) foreign material or the percentage fragments. Common physical properties of rice grain such as size, shape, color, uniformity, and general appearance.

The system consists of several steps such as: image acquisition, Image Pre-processing techniques, image enhancement, segmentation, thresholding, feature extraction, and morphological feature output are given to the Neural network-based classifier was developed to classify quality of rice grain sample.

A model of quality testing and identification is built which is based on morphological features & shape technology of image processing and neural network. The system will take an image of rice grain sample and identifies the grains and impurities if any and gives the result of quality of rice grain. To implement this we

used the digital web camera which is high resolution of pixel. And this input image is given to the system. With the help of interface between the Camera and PC is provided through USB Cable.

RELATED WORK

In this context number of author proposed their work and is what follows.

Megha and Kulkarni, [1] have proposed Classification and Quality Analysis of rice Grains. The intension of this work was to develop a real time application which was used to identify and classify of the rice grains and to grade (grade1, grade2, grade3) grains. The grading of rice sample is done according to the presence of impurities and size of the grain. The image samples were captured using camera and the images were stored in a database. The geometric feature and color features were considered in their work. The color feature includes red color, green color, blue color whereas Geometric features include the length, width, and the shape of the rice grain.

Chetna V. Maheshwari [2] proposed image processing techniques for identifying two varieties of rice based on shape and size. Image of a sample spread on the black paper were captured using a camera, the edge detection operation were performed to calculate the different parameters. Based on these parameters they classified rice seeds into three parts namely normal, small and long rice seeds and displayed the count of normal, small and long rice seeds on screen.

Harpreet Kaur & Baljit Singh [3] they proposed a technique for classification of rice grains using multi-class SVM (support vector machine). He collected sample image by spreading the grains on glass of scanner and using black sheet of paper as background. Firstly the images were preprocessed to remove noise. Then different techniques are used such as Smoothening, Segmentation, Binarization. The content of chalky grains were calculated, further the chalky degree is calculated. The length of the rice grain is analyzed by using grain shape and it is depends on its length and width of the rice grain. If its length is greater than 75% than it's considered as unbroken of else it's taken as broken. Here an SVM (support vector machine) which is a new type of classifier, where the grains were classified as grade A , grade B, grade C.

Bhavesh B. Prajapati, Sachin Patel [4] proposed algorithm for quality analysis of Basmati Rice using image processing techniques. They say with the help of this algorithm, an automated software system can be made to avoid the human inspection and related drawbacks. Image processing techniques can classify the rice grain with speed and accuracy. Photographic enlarger is used to measure the dimensions and to obtain the average length and width ratio of the basmati grain.

G.Ajay, M.Suneel, K.Kiran Kumar, P.Siva Prasad [5] are proposed a quality evaluation of rice grains using morphological methods. Grains were said to be broken kernels whose lengths were 75% of the rice grain size. Features like length, width, and perimeter are considered. Morphological operations like erosion and dilations are carried out. The image processing command is used to convert an image to gray scale image. Firstly the morphological features are extracted and the length of the rice grains are obtained and to set a threshold value for the length of grains. The grains whose values are less than the threshold (TH) were considered as broken grains. Whereas those grains are greater than the threshold (TH) value were considered as whole grains. The method is computationally efficient to perform the rice classification whether broken or not by the method is faster and simple.

Jagdeep Singh Aulakh , Dr. V.K. Banga [6] proposed the techniques for classification of rice grains by using image processing technique. The classification of grain is done according to the size of the grain (full, half or broken). The grains images were captured by using a Flat Bed Scanner (FBS), and also by using high resolution camera. Image thus acquired is then converted to binary image. And then apply morphological operations. And find out the properties of connected components of binary image. The object feature were extracted like Connectivity, Image size, Num objects, of image and based on these feature graph were plotted and the grain kernels which have lesser values than a threshold were discarded. And lastly calculate the number of full length rice grains in the sample image to grade the quality.

SYSTEM DEVELOPMENT

In the proposed system we have considered rice sample. Every grain is further classified based on purity. In the Manual process an expert inspects the individual grains. Based on the features like area, perimeter,

minor axis length and major axis length of the grains. The same features are used in automated method for classification of the grains.
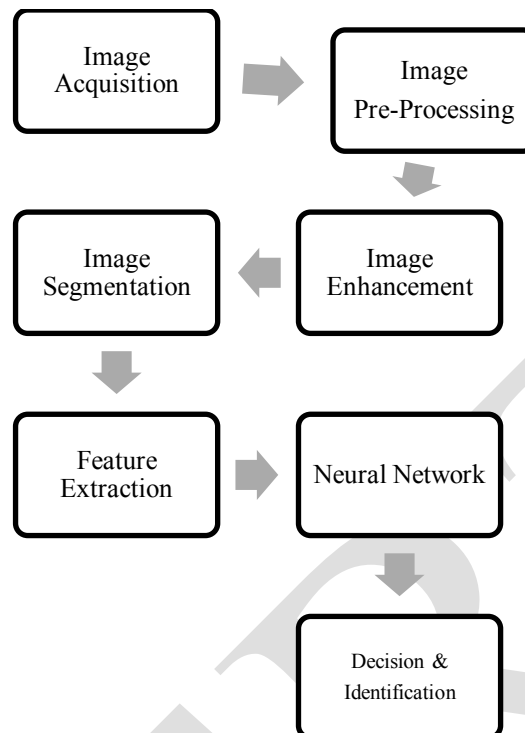
Figure1: Block Diagram of rice grain Identification & Classification Method

Image processing is defined as the action of acquired an image from some source. Take an image of rice grain sample with the help of high resolution web camera. A black sheet was used which gives the black background to the image used to helps in parameter extraction from the image. In Pre-processing each pixel of image is specified by 3 values (RGB) that is red, blue, and green. So firstly it converts into RGB image to Gray scale conversion [7] then Image Enhancement improves the clarity of image. and median filter helps to remove the noise and improve the quality of image. Median filter is a non-linear filter which is able to preserve edges, & it is often used to remove noise as pre-processing step [9] image segmentation is also known as thresholding method. It is based on threshold value. Image thresholding is simple, & effective, way of segmentation of an image into a foreground and background. To convert gray scale image into a black & white image. The key method is used here is Ostu's Method (maximum variance) thresholding. Extraction of quantitative information from segmented images is dealt with feature extraction [8] the features were extracted from images of rice grain sample are Perimeter, Area, Minor-axis Length and Major-axis Length etc. the collected data were then used in Neural Network Recognition system for Classification of rice grain.

In order to train the neural network, the two phases that are typically employed by the classification algorithms are training and testing. When the network training was finished, the network was tested and the classification purity of rice grain sample was calculated. The classification & identification approach is mainly depends upon the assumption of the image processing under consideration many features, can be extracted [1] In the initial characteristic properties of typical image features are classified and, based on these, each classification and identification purity of rice sample can be determined.

CONCLUSION

Here, we will conclude that purity of rice samples can effectively do by using the image processing. With coding in Mat lab software the setup used is also very common and easily available. This is also more accurate than the visual inspection. All this leads to better quality in food processing by image processing.

REFERENCES

1) Megha R. Siddagangappa A. H. Kulkarni,*" Classification and Quality Analysis of Food Grains."* IOSR- JCE, Volume 16, Issue 4, Ver. III, pp 01-10 jul-aug 2014.

2) Chetna V. Maheshwari, *"Machine Vision Technology for Oryza Sativa L. (Rice)"*. International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Volume-2, Issue 7, July 2013.

3) Harpreet Kaur, Baljit Singh, ijsrp*, classification and grading of rice grains using multi-class SVM.* Volume 3, Issue 4 April 2013.

4) Bhavesh B. Prajapati, Sachin Patel., *"Algorithmic approach to quality analysis of Indian basmati rice using digital image processing"*, International Journal of Emerging Technology and Advanced Engineering International Volume 3, Issue 3, March 2013.

5) G.Ajay, M.Suneel, K.Kiran Kumar, P.Siva Prasad.,*"Quality Evaluation of Rice Grains Using Morphological Methods"*, International Journal of Soft Computing and Engineering (IJSCE) ISSN: 22312307, Volume-2, Issue-6, January 2013.

6) Jagdeep Singh Aulakh, V.K. Banga. *"Grading of rice grains by image processing,"* International Journal of Engineering Research & Technology (IJERT) Vol. 1 Issue 4, June – 2012.

7) R.Kiruthika, S.Muruganand, Azha Periasamy *"Matching Of Different Rice Grain Using Digital Image Processing"* International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering Vol. 2, Issue 7, July 2013.

8) Abirami. S, Neelamegam. P *"Analysis of Rice Granules using image processing and neural network pattern recognition tool"*, International Journal of Computer Applications (0975 – 8887) Volume 96– No.7, June 2014.

9) *https://en.m.wikipedia org/wiki.*