

# Grain Quality Assessment for Rationing System

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**Abstract**— Food is the basic need of life. The quality of food is very important factor for proper nourishment of life so that, there is a requirement of assessment of food quality. In this paper, we proposed the system that assesses the food grain quality using image processing. It is proposed to work at ration shop to avoid the distribution of low quality grain. In this system, visual inspection for quality assessment is replaced by image processing technique. The quality parameters of grain are size, area, major axis length, minor axis length and perimeter. These features of grain are extracted from the image of grain sample. Based on these features, grain quality is assessed.

**Keywords**— *Image processing, Grain Quality, Ration Shop.*

## I. INTRODUCTION

Food is the basic need for survival. The quality of food is very important factor for proper nourishment of life. The public distribution system, a network of ration shops across the India is established by the Government of India. This system distributes ration (food and non-food items) at subsidized price to poor. There are many challenges in this system like quantity issue, lower quality of food, system transparency etc.

Digital imaging systems have found increasing use in particle characterization, agricultural and biological analysis as they are economical, fast and accurate. One of the areas of digital imaging applications is computer vision or machine vision for testing the quality of food materials. It provides cost effective technique for assessment.

In this paper, image processing approach is used for the assessment of food grain quality. We proposed the system for ration shop that assesses the quality of food grain (wheat) and distribute the food grain if it is within acceptable range of quality.

## II. RELATED WORK

Recently, in biological and agricultural field, use of computer vision and image processing technology, provides the efficient automation. There are many researches going on for automation in food quality inspection using image processing technology. Qing Yao, Jianhua Chen, Zexin Guan, Chengxiao Sun, Zhiwei Zhu developed an automatic system relying on machine vision, for inspection of rice appearance quality, including rice chalkiness and shape. In their system, minimum rectangle method was used for evaluating rice shape and

improved multi-threshold method based on maximum entropy was used for inspecting chalkiness of rice [1]. Yong Wu and Yi Pan proposed cereal grain size measurement method based on image processing technology. Their method measures the grain size parameters including grain number, area, size, roundness and size distribution [2]. Rubi Kambo and Amit Yerpude have given the principal component analysis approach for classification of different variety of basmati rice. They have used morphological features like Area, Major axis length, Minor axis length, Eccentricity and Perimeter for analysis of grain samples [3]. Megha R. Siddagangappa, A. H. Kulkarni introduced automated system which is used for grain type identification and analysis of grain quality. This system uses the Probabilistic Neural Network. The color and geometrical features are used as attributes for classification [4].

## III. PROPOSED SYSTEM

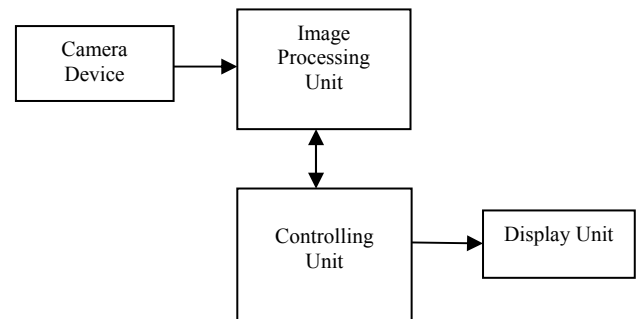


Fig.1 Block diagram of proposed system.

Fig.1 shows the block diagram of proposed system. This system is proposed to work at ration shop. The process starts when consumer asks for the ration (wheat). In this system, image of wheat sample is taken by camera device; this image is given to image processing unit. It is basically computer; the processing is done in MATLAB R2012a. This unit applies the image processing steps on image. The morphological features, size, shape, major axis length, minor axis length and perimeter of grains are extracted. These features are compared with standard quality features. According to this comparison, quality

of sample is decided. The decision signal is given to controller which displays the message on display unit.

#### A. Flowchart

Fig. 2 shows the flowchart of whole system.

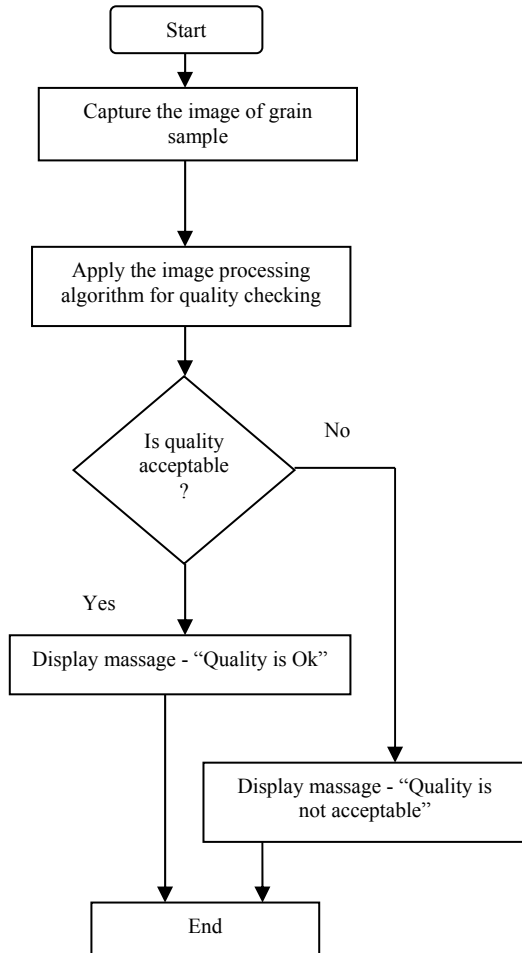


Fig.2 Flowchart of system.

#### B. Image Processing

The digital image processing is one of the divisions in electronic area where image being modified to pixels, stored in a digital storage and processed by computer. The image enhancement is the main task in image processing. The enhanced image gives the new information structures that provide better analysis of image. Digital image processing, extract information of an image for processing and analysis task. After taking the digital image from the digital camera, the system transferred to a computer for processing and storage by using different processes such as image capturing, image digitization, noise filtering and feature identification. The MATLAB R2012a provides the image processing toolbox

for ease in processing. Fig.3 gives the algorithm for grain quality checking.

#### • Algorithm :

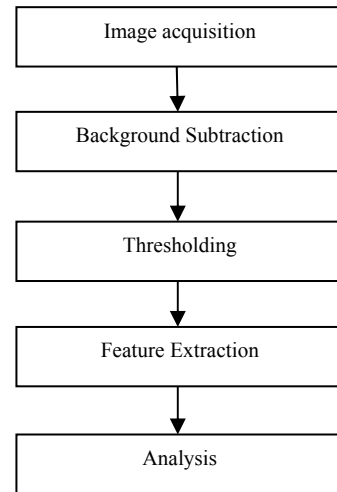


Fig.3 Algorithm

1. **Image Acquisition:** Image of grain sample is taken by camera device. The camera is fitted at fixed distance above from grain sample.
2. **Background Subtraction:** In this step, the background is eliminated and foreground is extracted which is the region of interest.
3. **Thresholding:** Thresholding is used to separate the region in an image with respect to the object, which is to be analyzed and this is based on the variation of intensity between the object pixel and background pixel.
4. **Feature Extraction:** In this step, qualitative information about the object is extracted from image. The geometrical features of grain are extracted from sample image. These features are
  - a. Area
  - b. Major axis length
  - c. Minor axis length
  - d. Perimeter
5. **Analysis:** The analysis is done based on extracted features. These features are compared with respective features of standard quality grain sample. Depending on degree of matching, the quality is decided.

#### IV. CONCLUSION

There is a requirement of automation in food quality assessment at ration shop. This system uses the image

processing approach for grain quality assessment. The analysis is based on morphological features. It replaces manual inspection by machine vision. This approach gives the cost effective solution for assessment.

#### V. FUTURE WORK

The future work of this system is assessment of quality of other food items at ration shop and automation in consumer identification using RFID module. We also create online database for Government Record.

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