

# Image Processing in Quality Assessment of Pulses

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## Abstract

Food is essential for nourishment and sustenance of life. The addition of impurities in food affects the composition and quality of food. Quality assessment of grains is a very big challenge since time immemorial. Human perception based on visual inspection has long been recognized as a guide to quality assessment but the results are not accurate and reliable. This paper presents the usefulness of image processing in quality assessment of pulses grains.

**Keywords:** Food, Grains, Image processing, Quality,

## 1. Introduction

Indian economy is based on agriculture to a larger extent. Due to advancement in cultivation technology, the total cultivation area and yield for agricultural products has increased rapidly [1]. Pulses are grown in many regions across India. Also India is a leading producer and consumer of pulses in the entire world. Moreover pulses are important part of our diet. The quality of such food grains has been assessed traditionally by human inspectors to detect defects, color, size or strange features and classify the products in its appropriate category [6]. But quality assessment through visual inspection by human inspectors is not up to mark as it is affected by external factors like fatigue, bias etc. To overcome this problem, machine vision and image processing techniques are successfully used for recognition and classification of grain samples [7].

## 2. What is Image Processing?

Image processing represents complex field in which the input to the system is an image in any form and the output of the processing obtained after using different filters and tools is the processed image in the form of any parameter related to the image. Image processing is the study of any algorithm that takes an image as input and returns an image as output.

It Includes:

- Image display and printing
- Image editing and manipulation
- Image enhancement

- Feature detection
- Image compression

## 3. What is edge detection?

Edge detection is one of the most critical and hot topic for digital images, for segmenting images and to improve the quality of the images. As we know the data abstraction i.e it focuses on some of its data but eliminates unwanted data. In the same way, edge detection is used to trim down and strain some amount of data and inadequate information, at the same time preserving the important structural properties in an image.

## 4. Importance of edge detection in image processing

Edge detection is a very important area in the field of image processing. Edges define the boundaries between the regions in an image, which helps with segmentation and object recognition. They can show where shadows fall in an image or any other distinct change in the intensity of an image. Edge detection is a fundamental of low level image processing and good edges are necessary for higher level processing. Edge detection is one of the most commonly used operations in image analysis. An edge is defined by a discontinuity in grey level values. In other words, an edge is the boundary between an object and the background. The shape of edges in images depends on many parameters: the geometrical and optical properties of the object, the illumination conditions and the noise level in the images. The main goal of edge detection is to mark the points in an image at which the intensity changes sharply.

## 5. Need of the study

In agricultural industry, quality assessment of product is main problem. Now a day the quality of grain seed has been determined manually through visual inspection by experienced technicians so it requires high degree of accuracy to satisfy customer's need.

## 6. Objective of the study:

1. To highlight the importance of image processing in assessing quality of pulses
2. To find the percentage purity of the pulses samples

## 7. Research Methodology

**Step 1:** Firstly we will capture the image of pulse grain sample and then we will develop a code for loading the image in the database of the MATLAB editor window. This is done for the creation of the image in the figure window for the operation.

**Step 2:** After that we will develop a code for the background subtraction from the image. By practicing this we get the more uniform background.

**Step 3:** We will develop a code for converting this image into the binary image.

**Step 4:** After that we will develop a code for the edge detection of the pulses images using edge detector. After that we will do the coding for filtering of the images and lastly we apply the code for finding the percentage purity of the pulses.

## 8. Image acquisition and processing

To capture the image we need a digital camera, sample to be tested and white background. Then we put the pulses grains on white paper. With the help of digital camera, images are acquired by keeping fixed distance. The acquired image is converted to gray scale image and then image enhancement is done to remove the noise from an image.

## 9. Calculation of pixel area

Algorithm is developed in MATLAB programming language to calculate the number of seed grains in the given sample and pixel area of each seed grain. Then a threshold for pixel area is assigned. The seed grains whose pixel area falls below the threshold value will be discarded. So in this way we will get the number of pure pulse grains whose pixel area is equal to or above the threshold value to be assigned. Then percentage purity of sample is calculated using the following formula:

**Percentage Purity =**

$$\frac{\text{No of grains having pixel area equal to or above threshold}}{\text{Total no. of grains}} \times 100$$

## Conclusions

Image processing techniques provide a way to grade the food grains. In this paper a technique for quality assessment of pulses grains is presented by measuring the pixel area which improves the accuracy of quality assessment of food grains.

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