ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering
Vol. 2, Issue 7, July 2013

MATCHING OF DIFFERENT RICE GRAINS USING DIGITAL IMAGE PROCESSING

R.Kiruthika[1], S.Muruganand[2], Azha Periasamy[3]

M.Phill., Scholar, Department of Electronics and Instrumentation, Bharathiar University, Coimbatore, TamilNadu, India[1]

Assistant Professor, Department of Electronics and Instrumentation, Bharathiar University,Coimbatore,TamilNadu, India[2]

Assistant Professor, Department of Electronics and Instrumentation, Bharathiar University, Coimbatore, TamilNadu, India [3]

Abstract: Different type of rice grain varieties is studied using image processing techniques. In the present work a digital imaging approach has been devised in order to investigate different types of characteristics to identify the rice varieties. Two different common rice varieties were used in tests for defining. These include existing standards for rice length, area and aspect ratio features of rice. It successfully shows the effectiveness of compactness as its features. When the data base of this work can recognize the rices, which has been trained the data in number of time; and hence it has been identified.

Keywords: MATLAB, pre-processing, segmentation, blob analysis, feature matching.

I. INTRODUCTION

Rice is grown in many regions across India. For about 65% of the people living in India, rice is a staple food for them. Rice is essential food to life in India and it is grown on a majority of the rural farms. It determines the aspect ratio distribution which is very important for elongation. The rice has been used as a sample. The samples examined were from existing standards for rice length, area and aspect ratio features .From the analysis, reference aspect ratios were assigned to classify the grains. It provides irrigate area, cropping pattern and rice productivity. In this observation, high resolution multi data from Land IR 8, PASMATHI SINGLE MATTAI RICE and IR16 data were selected for analysis. This paper is used to analyse the rice grains machine vision system using neural network algorithm[1].S.P.Shouche (2001), used a Shape analysis of grains of Indian wheat varieties[2].Travis and Draper (1985) used a computer-based imaging system for recognition of seed shape of 49 different species[3]. In this paper, a new approach for identification of rice's grain variety using logic algorithm was investigated. It was found that it is possible to know the undesired content within 70% accuracy.

II. BLOCK DIAGRAM

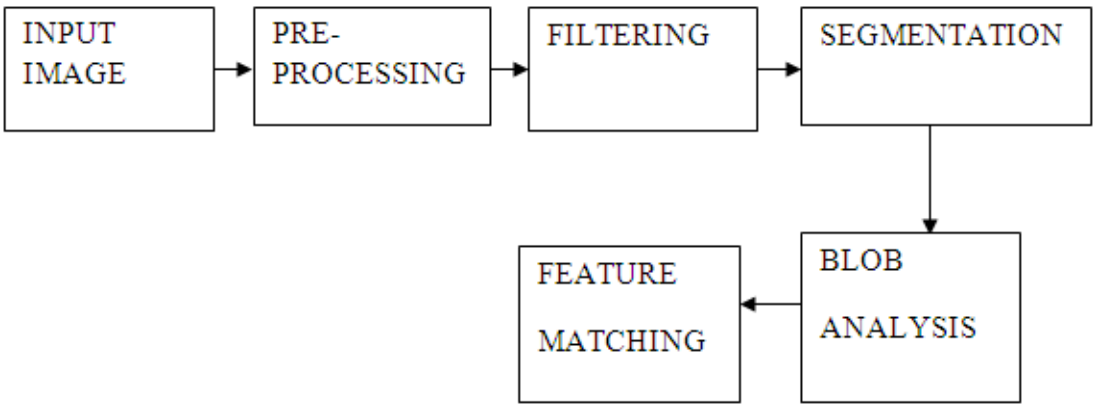

Fig. 1 Block Diagram

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering
Vol. 2, Issue 7, July 2013

III. IMAGE ACQUISITION

Most image processing programs are designed to start by loading an image from disk. They are the different type of file formats that are used in image acquisition. This capability means that you can skip the steps involved in using two separated programs; first to control the acquisition and the second for data analysis. Image acquisition is software dependent. It is usually implemented through specific MIL (matrix imaging library) real time camera.

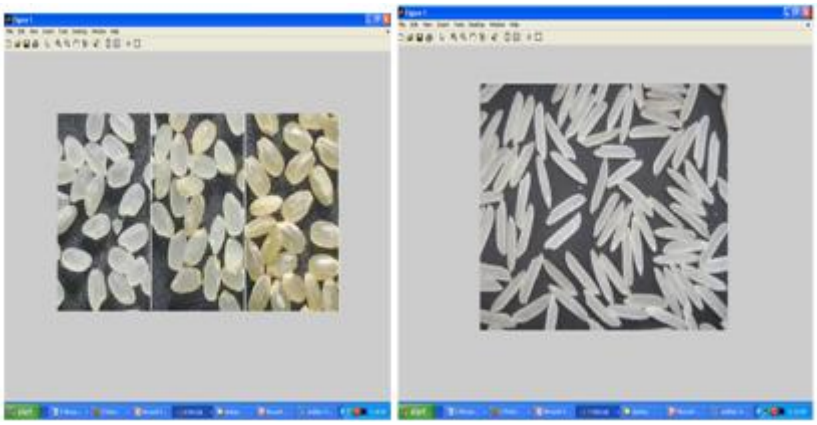

Fig. 2 Input Images of Rices

IV. PREPROCESSING

A. Gray Scale Image: Gray scale image is an image that each pixel of rices holds a single sample, the rice intensity information, also known as black-and-white image. The intensity is calculated by common formula: 30% of Red + 59% of Green + 11 % of Blue. After processing the gray scale level for image, It has only black-and-white. It varies from black at the weakest intensity to white at the strongest.

B. RGB to Gray: Image in which each pixel is specified by three values one each for the red, blue, and green. The array of class single, or double whose pixel values specify intensity values. So it converts into RGB to Gray scale conversion. For single or double arrays, values range from [0, 1]. For uint8, values range from [0, 255]. For uint16, values range from [0, 65535]. In this work, the image has been taken from the RGB colour in jpeg format. it has much of pixel rate, due to pixel rate error been occur for that reason RGB image is converted into gray scale image . It is only a two dimensional as pixel rate also reduce easily get real image.

C. Binary Image: It converts the gray scale to a binary. The output image replaces all pixels in the input image with luminance greater than level with the value 1 (white) and replaces all other pixels with the value 0 (black).It specifies the level in the range [0,1], regardless of the class of the input image. The function gray thresh can be used to compute the level argument automatically in order to separate an object in the image from the background. The colour of the object (usually white) is referred to as the foreground colour. The rest (usually black) is referred to as the background colour.

V. FILTERING

The purpose of smoothing is to reduce noise and improve the visual quality of the image. Often, smoothing is referred to as filtering. In this work, median filter is used.

A. Median Filter: A median filter is a non-linear digital filter which is able to preserve sharp signal changes and is very effective in removing impulse noise (or salt and pepper noise) an impulse noise has a gray level with higher or lower value that is different from the neighbourhood point. Linear filtering technique is known for signal and for being particularly effective in removing impulse noise of rices. It is referred the median filters have advantages over linear filters for this type of noise. Therefore median filter is widely used in digital signal and image/video processing applications [3]. In standard median operation it is implemented by sliding a

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering
Vol. 2, Issue 7, July 2013

window of odd size (e.g. 3x3 windows) over an image. At each window position the sampled values of signal or rice image are stored, and the median value of the samples replace. The sample in the centre of the window is shown in Figure 1.

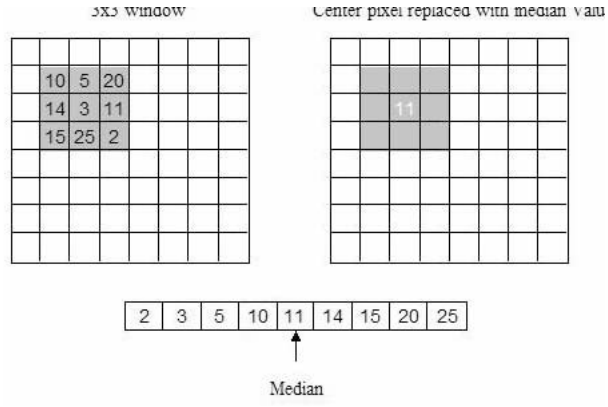

Fig. 3 Median Filtering Table

Let W be a window with an odd number of points. Then the median filter is given by

$$ys = median\{xr - s : r \in W\} \quad (2.1)$$

The main problem of the median filter is its high computational cost (for sorting n pixels, the time complexity is 0(n log n), even with the most effective) When the median filter is carried out in real time, the one of the software implemented is a general purpose processors does not usually give good results. The execution times are reduced by implementing median filters on FPGAs.

VI. SEGMENTATION

The purpose of image segmentation is to partition an image into meaningful regions. The segmentation is based on measurements taken from the images and might be grey level, colour, texture, depth or motion. Here in my work .I used edge based segmentation.

A. Edge Based Segmentation: An edge-detection filter can also be used to improve the rice's appearance of blurred image. The image computing techniques have found in wide applications. One of the important applications is edge detection for Image segmentation. In this work, I have used Roberts edge based segmentation.

B. Roberts: It returns a two-dimensional array of the same size of rices Image. If rice image is in byte type or integer type, then the resultant rice image is of integer type. Its Cross operator is used in image processing and computer vision for edge detection .It was one of the first edge detectors and initially proposed by Lawrence Roberts, as a differential operator. The Robert's Cross operator is to approximate the gradient of a rice grain's image through discrete differentiation which is achieved by computing the sum of the squares of the differences between diagonally adjacent pixels [3].

Roberts proposed the following equations.

$$y_{i,j} = \sqrt{x_{i,j}}$$

$$z_{i,j} = \sqrt{(y_{i,j} - y_{i+1,j+1})^2 + (y_{i+1,j} - y_{i,j+1})^2}$$

Where x is the initial intensity value in the image, z is the computed derivative and it represents the location in the image.

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering
Vol. 2, Issue 7, July 2013

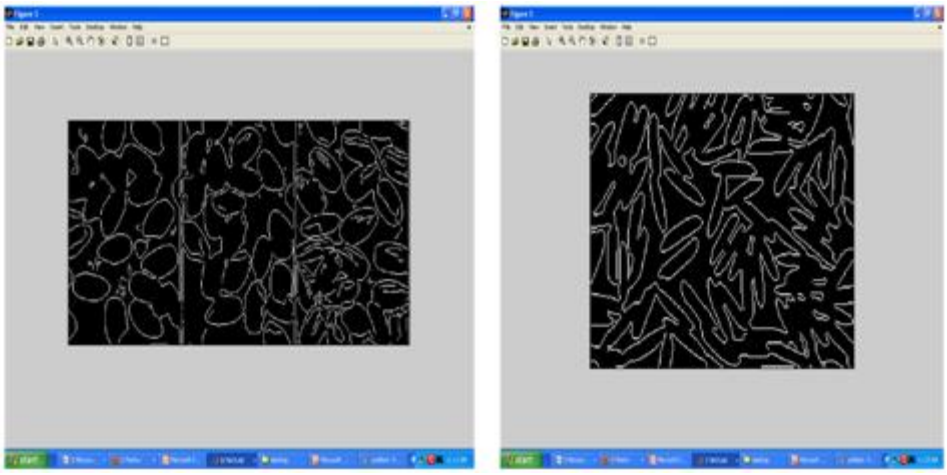

Fig. 4 Edge Image Rices

VII. BLOB ANALYSIS

The blob is defined as a region of connected rice pixels. Blob analysis is the identification and study of these regions in a rice grain's image. The algorithms discern pixels by their value and place them in one of two categories: the foreground (typically pixels with a non-zero value) or the background (pixel a zero value).In typical application that use blob analysis, the blob features usually calculated are area and perimeter, feret diameter, blob shape, location. The versatility of blob analysis tools makes them suitable for a wide variety of applications such as pick-and place. Since a blob is a region of touching rice pixels and analysis of tool typically consider touching foreground pixels to be part of the same blob.

A. Region Props: It measures the properties of image regions

B. Area: The function region props in MATLAB were used to measure the rice area of a selected region of an image in pixel count. Before applying the function region props, the actual image is converted into a binary image .The Region props instruction is used to estimate area enclosed .The area is the actual number of pixels in the selected region. The pixel count of the processed image depends on the distance between the camera and the object when the picture is taken, smallest distance and larger pixel counts. A reference object is an object with known area, needed to translate the pixel count area. In this study, the two group of rices area were calculated.

C. Bounding Box: The minimum or smallest bounding or enclosing box rice images are used in geometrical. For the set of rice is called as N dimensions .The bounding box measure the rice grain's length, and area by using digital image processing method.

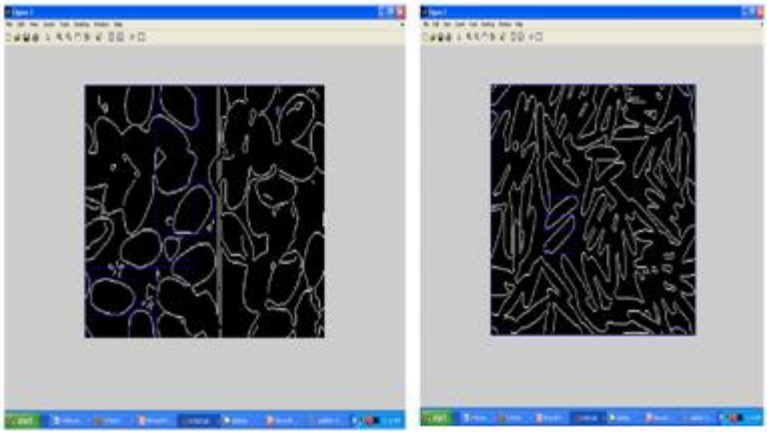

Fig. 5 Blob Analysis of Rices Images

ISSN (Print) : 2320 – 3765
ISSN (Online): 2278 – 8875

International Journal of Advanced Research in Electrical, Electronics and Instrumentation Engineering
Vol. 2, Issue 7, July 2013

VIII. FEATURE MATCHING

The feature matching [11] is referred that it can depend on the rice length and area changes in the induced non-rigid deformation between the two structures. The metric on two varieties of rice grains is properly incorporated into the formulation matching. This approach is calculated the rices area and length using image processing and Logic algorithm to match the rice data. If the rices data are match means it equal to zero (=0). The rice data are not equal means it does not equal to zero (=/0).In this, two logics are used to match the two varieties of rices.

IX. CONCLUSION

MATLAB Software system developed with such as logic algorithm provides direct assessment of quality of rice grains. It provides all relevant parameters about rice grains by image analysis. With proper selection of software tools, we can design a low cost tool for quality analysis of rice grains. In future, varieties of rices grains will be taken and calculated the area, length and shape analysis in digital image processing. This work is mostly used in food industry.

ACKNOWLEDGMENTS

Our thanks to the experts who have contributed towards development of the template.

REFERENCES

[1] Classification of Philippine Rice Grains Using Machine Vision and Artificial Neural Networks Jose D Guzman and Engelbert K. Peralta
[2] John C. Ross. Image Processing Hand book, CRC Press. 1994.
[3] R. Vinothkanna, Amitabh Wahi A Novel Approach for Extracting Fingerprint Features from Blurred Images.2012
[4] N. Senthil kumaran, R. Rajesh, "Edge Detection Techniques for Image Segmentation and A Survey of Soft Computing Approaches", International Journal of Recent Trends in Engineering, Vol. 1, No. 2, PP.250-254, May 2009.
[5] A. K. Jain, "Fundamentals of Digital Image Processing" , PrenticeHall of India, First Edition,1989
[6] Rafael C.Gonzalez and Richard E. woods, "Digital Image Processing", Pearson Education, Second Edition,2005
[7] M. Moore. A DSP-based real time image processing system. In the Proceedings of the 6th International conference on signal processing applications and technology, Boston MA, August 1995.
[8] K. S. Srinivasan and D. Ebenezer, "A New Fast and Efficient Decision-Based Algorithm for Removal of High-Density Impulse Noises," IEEE Signal Processing Letters, Vol. 14, No. 3, March 2007
[9] A. K. Jain, "Fundamentals of Digital Image Processing" , PrenticeHall of India, First Edition,1989
[10] Rafael C.Gonzalez and Richard E. woods, "Digital Image Processing", Pearson Education, Second Edition,2005
[11] M. Moore. A DSP-based real time image processing system. In the Proceedings of the 6th International conference on signal processing applications and technology, Boston MA, August 1995.
[12] K. S. Srinivasan and D. Ebenezer, "A New Fast and Efficient Decision-Based Algorithm for Removal of High-Density Impulse Noises," IEEE Signal Processing Letters, Vol. 14, No. 3, March 2007