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Comparative and Qualitative Analysis of Rice in Haryana Using Image Processing Technique

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ABSTRACT: Food is necessity of human being, it is cultivated by farmer but the extreme defy is to maintain its better eminence, which is a big challenge of agriculture Industry. The allied industries develop the various techniques for grain (rice) classification and valuation which are mostly done by manually. As the manual process is time consuming may vary result as error occurs (human error), so the solution is available in image processing. The scrutiny of physical appearance such as rice size shape, chalkiness, milling degree, bulk density moisture content and whiteness based on physical and chemical emergence, amylase and gelatinization etc. This manuscript presents comparative analysis of basmati 370 and kernel local by using Image processing of rice cultivated in the region of Haryana (India).
KEYWORDS: Milling degree, largeness density, amylase, gelatinization, basmati 370, Image processing.

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I. INTRODUCTION

Starting from the maturity of human civilization, food cultivation and value assessment is a major source in producing numerous types of grains. Oryza Sativa La (Rice) is also a type of food grain consumed by human and cultivated on earth. India and China are two giant countries in cultivation of rice.

In case of India, state of Punjab, Haryana, Bihar, Uttar-Pradesh, Chhattisgarh, Orissa, Andhra-Pradesh, Telengana, Tamil Naidu, Karnataka, Maharashtra and Gujarat produces rice. The quality of rice varies state wise as the soil nutrients, water and environment and cultivation method differs. Haryana is state where aromatic rice (Tarori Basmati, Basmati-370 , and Kernel Local) is cultivated from Ambala to Sonipat on NH-1 belt.

Identification and analysis is the most important part of grading of grain from the point of view of quality of rice. The recognition of rice physically takes much time and effects the decision of grain inspector. In case to make the edge on human method, machine calculating method is developed and given in[1].The method developed by Taguchi known as Taguchi method for robust engineering which is also applied for the identification of rice quality presented in[2, 3] .In the manuscript [3-5].The seed germination with image processing based algorithm is also developed which analysis the rice evaluation which is obtainable in , in case of increase the quality of soil for rice the effect of gypsum and rice straw composed is analyzed in [6], seedling quality and growth after transplant also effects the rice [7]. However in growth timings rice integrity detection using image processing is also done in literature in which adhesion rice is segmented with the segmentation algorithm based point of concavity detection[8] , rice superiority analysis is given [6, 9-12] and non-destructive quality investigation of Indian basmati rice is given in[1, 8, 13] broken rice testing is given in[14, 15] and evaluation of Oryza Sative La quality is given in [1, 5, 7, 10]. The effect of microwave action on rice moisture removal and milled rice characteristics is given in [16, 17] . The chalkiness accurately is extracted by differences in grayscale level between chalky and normal rice were classified by image processing is adopted in [18].The infrared transmittance spectrometry on rice samples were applied by Siriphollakul in[19]. The evaluation and analysis with chalkiness physical property and image processing is applied in grading of Oryza Sative La is given in [11, 15, 17, 18, 20].

The analysis of two variety of rice is done in this paper by using image processing and with analysis and comparison of result. The high resolution camera is used for image capturing software tool used is Mat-Lab 2015 b. The used of this application is grown widely and is easily assessable in market

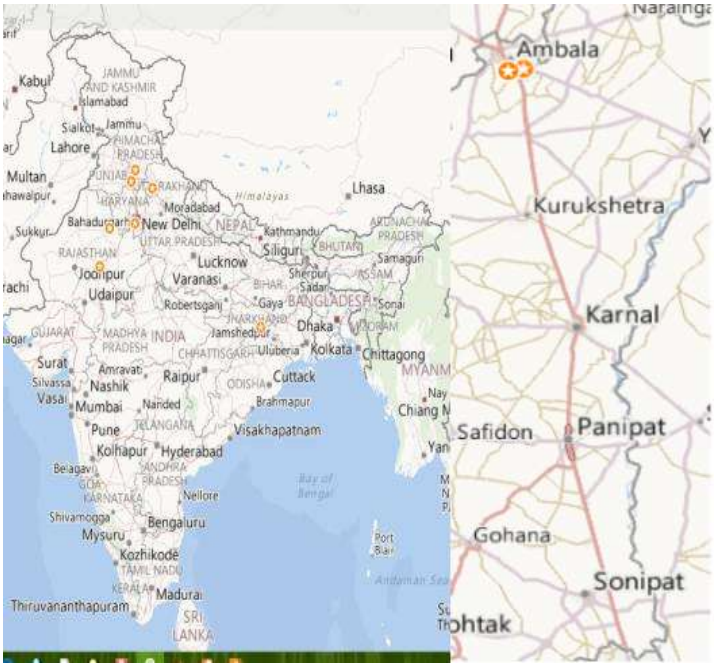


Figure 1: Haryana Rice Cultivation Area

II. PROBLEM STATEMENT

In point of view of a farmer and a consumer quality of grain is very important in terms of basic need and to maintain health. Quality analysis of grain is maintained by experience grain knowledgeable person but result may vary as per the human behavior and error therefore quality analysis gets affected. To overcome this problem image processing technique is proposed.

Rice quality analysis

Here rice quality analysis of Basmati 370 and Kernel local is taken as task. The examination is lying on the foundations of measurement of grain size and shape by image processing. An average length and breadth of rice grain and length–breadth (L/B) ratio is given in Eq. (1)

$$\frac{L}{B} = \frac{Avreage\ \ length\ of\ \ Rice}{Avreage\ \ bredth\ of\ \ Rice} \times 100 \quad (1)$$

III. METHODOLOGY

In this segment rice classification is done by finding of edges and image shape parameters. Procedural steps followed are:

i. Extraction of rice image
ii. Read extracted image into image processing tool in MATLAB-2015 b
iii. Processing the image.
iv. Analysis of rice sample 1 and sample 2 in image

3.1 Extraction of rice image

The captured image using a high resolution digital camera is stored in computer system using any of the method (Bluetooth/USB/E-mail) at preferred drive (C/D/E/F/Desktop) in a folder where it may call as the image processing is applied. The captured image is shown in Fig. 2 and Fig. 3. Here, the Figure 2 is considered as sample 1(Normal rice grain 1) and Figure 3 is considered as sample 2 (Normal rice grain 2).

Figure 2: Basmati 370

Figure 3: Karnal local

3.2 Read extracted image into image processing tool in MATLAB-2015 b

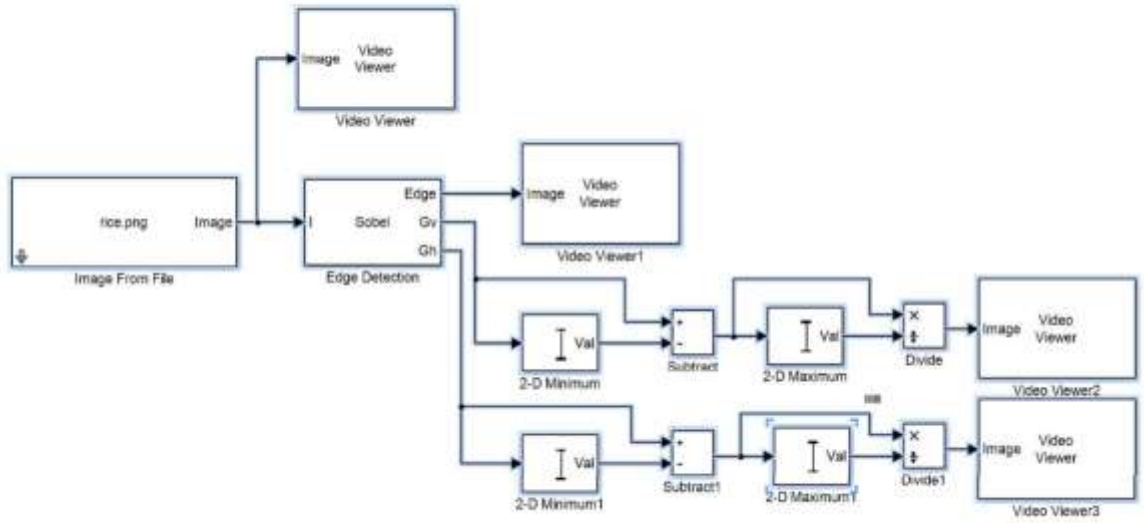


Figure 4: Modeling for rice (sample 1(Basmati 370) and sample2 (kernel local)) image processing.

3.3 Processing the image

In this process, illumination is brighter in middle of the rice image comparative to the bottom one. This makes the background standardized after that duplicate converted into binary representation. For making the background standardized guesstimates of the image background as a detach image and then subtract this guesstimate from original image of the sample rice.

The figure is call from the slab of rice in ".png" format have 256 × 256 pixels, the model is run with sampling time of

10 sec. image video viewer shows the filter image. For edge detection edge detection block perform the task.

3.4 Analysis of rice

Sample 1 in image processing

For creating the parametric surface surf command is used, which enables mathematical function over a rectangular region. Surf requires data of class double as

*Sample rice*1

*Surf (double (background (*1 : 8 : *end* ,1 : 8 : *end*))), zlim *([*0 255*]);*

Set (gca, ' ydir ', ' reverse ');

For this first step is to make background using double command. Here 1 out of 8 pixels in each direction is used for indexing syntax. If not done in ratio of 1:8 the surface plot is too dense. The curve is representing in Figure.

8 where surface display *[*0 0*]* representing the origin of upper left of the corner image of rice. Highest pixel value is present in highest part of the curve. Lowest pixel value occurs at bottom of the image.

The area of rice in particular surface by using pixel count with number of rice is well represented in Figure 9. Here the sample 1 average grain area comes out to be 3.08821mm^2. The average breadth of area of Basmati 370 is in between 1.9 mm to 2.1 mm.

Table 1: Result of Image Sample Rice 1

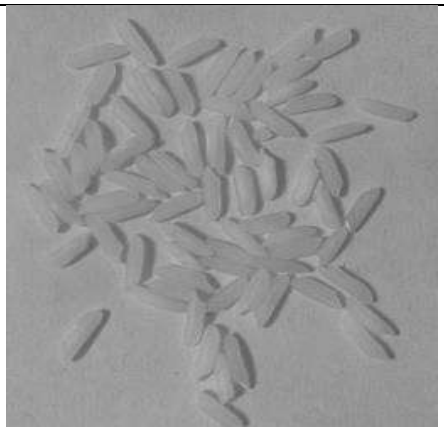


Figure 5:Gray scale of rice sample 1

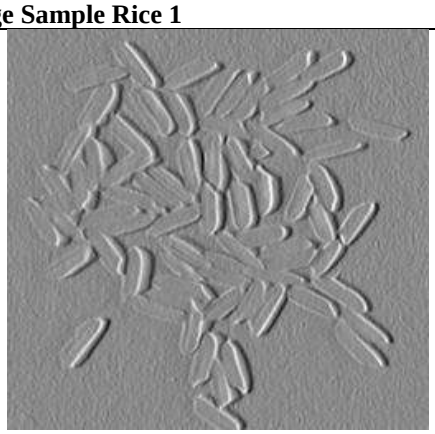


Figure 6:Filter gray scale image of rice sample 1

Figure 7:Edge detection of rice sample1

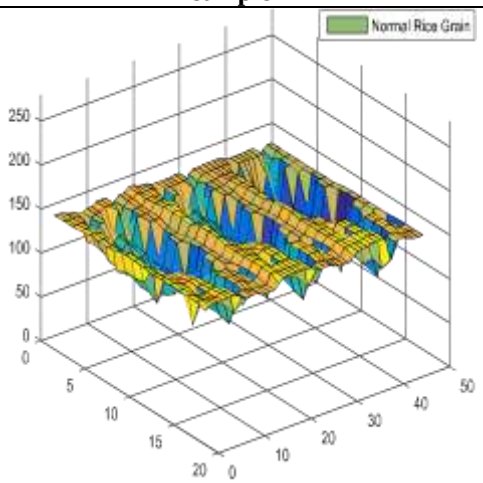


Figure 8:Surface image of rice sample 1

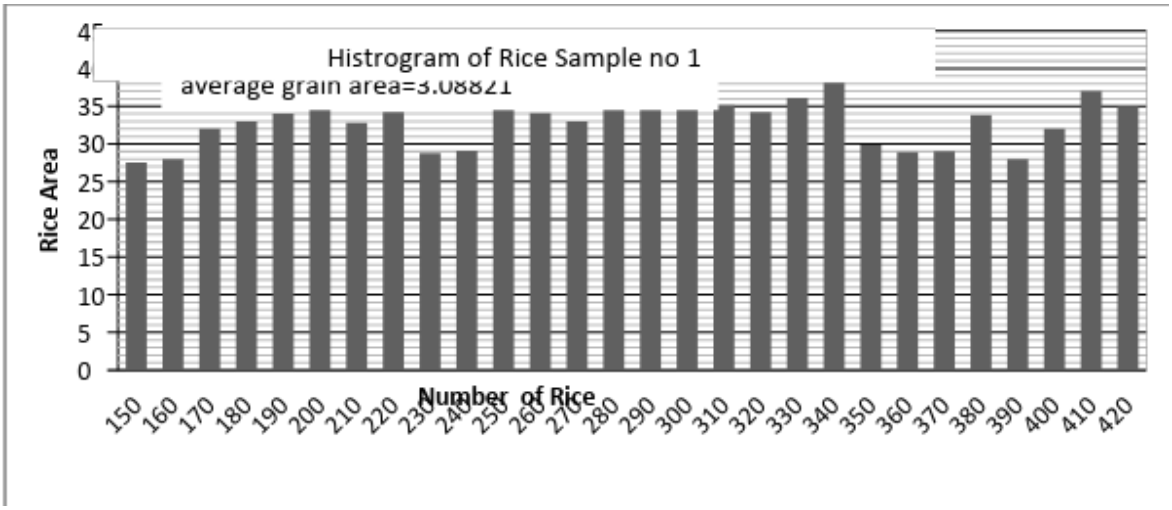


Figure 9 Histogram representation of rice area sample 1

Analysis of rice sample 2 in image processing

The sample image 2 is of karnel local randomly taken from the NH1 belt of Haryana state of India. For the analysis the image is uploaded to the model where video viewer process image to the gray scale and then the

pass through the filtration process after that edge is detected in the model. The Figure 10in Table 2 shows the gray scale conversion of rice of sample 2 here of karnal local.

Table 2: Result of Image Sample Rice 2

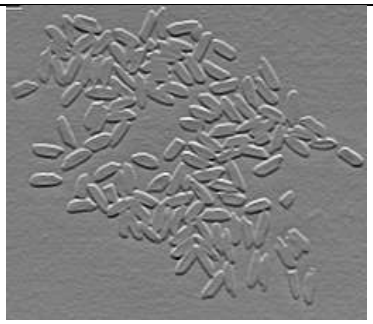


Figure 10: Gray Scale of rice sample 2

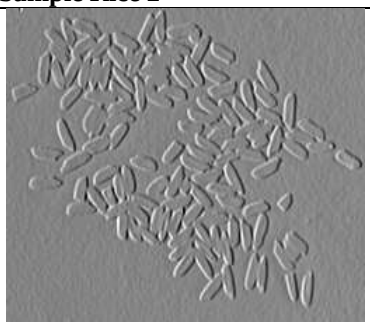


Figure 11: Filter gray Scale of rice Sample 2

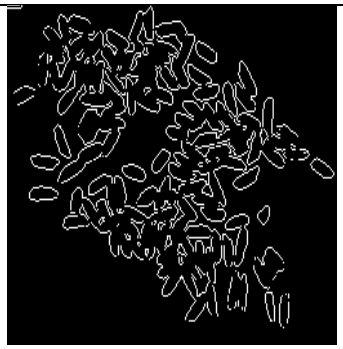
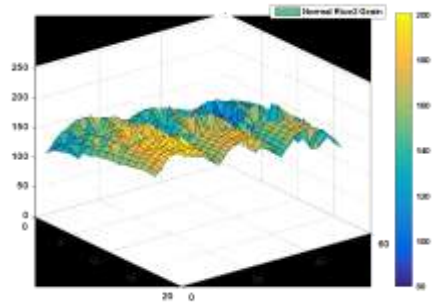


Figure12:Edge detection of rice sample 2



4

Figure 13: Surface image of rice sample 2

Filter gray scale process is applied to the Figure 10 and the filtered image is shown in Figure 11, the surface image of sample rice 2. At this stage subtraction of the background using approximation of background, captured image from the original image and view the resulting image. After subtracting the adjusted background image from the original image, the resulting image has a uniform background but is now a bit dark for analysis. The process of Edge detection by using image processing is as shown in Figure 14. In Figure 13 surface image of rice sample is shown. Here the pixel coordinates of the rice sample 2 are expressed as (x_i, y_i) *where* $0 \le i \le M$ M is the pixel point of the rice and the coordinates of the rice are given as

$$x = \frac{1}{M}\sum_{i=0}^{M} x_i \qquad (2)$$

$$y = \frac{1}{M}\sum_{i=0}^{M} y_i \qquad (3)$$

The histogram of the rice sample 2 is shown in Figure 14 here average grain area is come out to be 21.67.

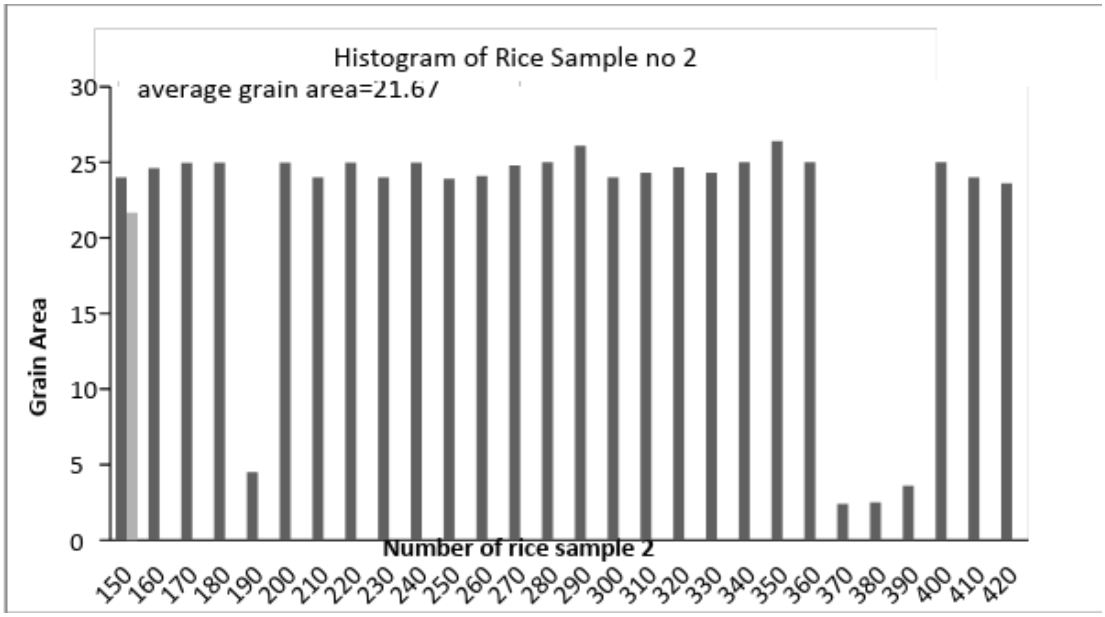


Figure 14: Histogram of rice Sample 2

IV. RESULT AND DISCUSSION

As the image process is applied to the two samples that is Sample 1 of Basmati 370 and Karnal local (Sample 2) of Haryana State of India on NH1 belt. The Physical property (Length, Breadth, Ratio (L/B) and average test weight) and the comparative results are shown in Table 3. The relative result of Sample 1 comes out to be good.

Table 3: Comparative Analysis of Physical Properties of rice Sample 1 and Sample 2

Sr. No	Rice	Length(mm)	Breadth(mm)	Ratio(L/B)	Av. test Weight(g)
1	Sample 1	$7.05 \pm .20$	1.89 ± 0.20	3.70	14.50 ± 0.25
2	Sample 2	4.90 ± 0.31	2.07 ± 0.09	2.37	11.47 ± 0.23

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