

RICE GRAIN QUALITY ANALYSIS USING IMAGE PROCESSING TECHNIQUES

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Abstract

The rice is the major food crop all over the world, where the most of the world's population relies on the rice to fulfill their daily nutritional needs. India is one of the world's largest producer and exporter of rice. Grain production plays a major role in our country's agricultural income. As soon as the rice reaches the market after harvest, its quality determines its sale potential. Market quality is usually based on the rice grains physical traits.

The proposed work focuses on quality analysis based on the measurement of its physical parameter. Normally, the grain seeds are examined visually by experts. But the outcome becomes inconsistent and time consuming. Computer vision method is introduced to reduce such limitations. The primary goal of this research is to offer an image processing-based approach for classifying rice types and quality. To assess the rice grains different techniques are applied to different samples of the rice to identify their physical parameters and overall quality. Using picture handling methods, research proposes a solution for examining and assessing rice grains based on grain size and shape.

KEYWORD: Rice grain, Grain evaluation, Mat Lab

1. INTRODUCTION

Rice is the extensively consumed food all over the world.. The rice grains can also be stored for a longer period of time. Asian countries are the major rice producers. Rice-producing countries compete with one another primarily to provide the highest quality rice on the market. Thus the assessment of rice quality is essential to safeguard the customers from low quality products.

A rice seed comes from the grass plant. The rice is the agricultural product cultivated for human consumption and it plays a major role in a person's daily nutritional and caloric consumption. The physical and chemical parameters of rice are the important components. The classification of rice is primarily based on its color in the market and the wheat quality is also determined based on this factor. The grain classification and identification system ensures the quality of rice. Grain classification depends on the following characteristics bundle weight, moisture content, damaged kernels and foreign particles.

2. PROBLEM IDENTIFICATION

Rice grain quality has become a major concern for domestic consumption and possibly international trade. Stones, weed seeds, chaff, and damaged seeds are the impurities found in these grains.

The level of automation applied to test the quality of rice grain is less and most of the work is performed manually by the technician. The workload is so heavy that workers will become exhausted, and they will need sample testing experience. It also makes testing more expensive and time-consuming. This discrepancy is becoming more noticeable as the import and export sector develops. Grain types and quality are necessary at numerous stages throughout grain handling operations. Therefore, this has become a serious issue for the consumer. To overcome such problems current technology is used.

3. CLASSIFICATION OF GRAIN QUALITY

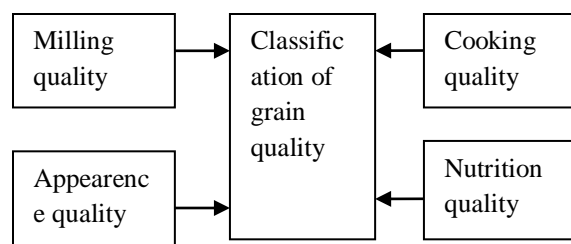


Figure.1 Classification of grain quality

4. PROPOSED SYSTEM

The proposed research focuses on rice grain quality analysis based on the measurement of its physical parameters. The grain size and shape comes under physical parameters. Image processing is an essential and advanced technological field that has seen tremendous advancements.

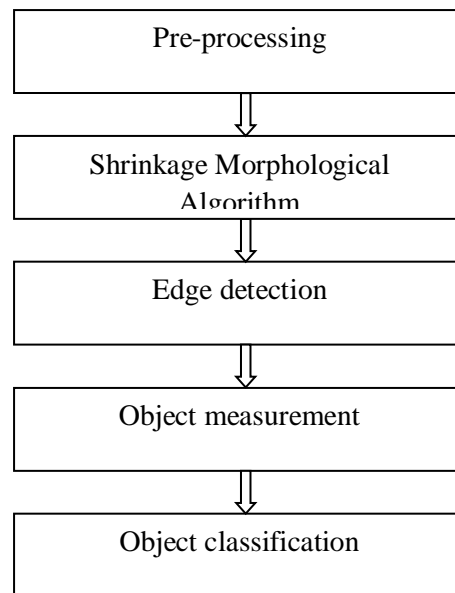


Figure. 2 Architecture diagram

Image processing is the process of modifying an image in order to perform operations on it. Thus it can produce a better and more appealing image. When employing the DIP technique, all sorts of data must go through three general phases: pre-processing, augmentation, and presentation, and information extraction. Figure.2 shows the architecture diagram of the proposed method.

5. SOFTWARE

MATLAB software is used to implement the proposed method. Digital image processing is one of the fast growing technology today. The library in image Processing provides a complete set of standard algorithms and tools for processing, analyzing and visualizing the image. It performs digital image processing techniques for feature extraction. Image processing produces an enhanced image by performing some operations. Thus it gives a useful information. Here the input image is processed and the output will be an image or a feature extracted from the image.

The image was taken with a color camera and saved in RGB color space. A filter is used to reduce the noise that arises during the image acquiring process as well as to sharpen the image and the threshold technique is used to separated the image from the black background.

The morphological image processing techniques are removal and restoration of pixels. Erosion is used to split the connected parts of the grains without compromising their integrity. Regions extend beyond their bounds during dilation, which is the polar opposite of contraction. The dilation process occurs after an erosion. The purpose of dilation is to restore the original shape of degraded features without reconnecting the divided elements.

Edge detection is a technique for detecting the presence and position of edges in images by altering the image's intensity. The area of edges are identified by edge detection. Canny algorithm is used to detect and split the edges of rice grains from the black background.

The amount of rice grains is counted using object measurement. The image is then subjected to edge detection techniques once the rice grains have been counted. The end values of each grain is determined. To link the endpoints and calculate the size of each grain, a caliper is used. Calculate the length-breadth ratio after obtaining the values. The above measured values are needed for object classification. The standard databases are taken from the laboratory manual.

Advantages

- It is simple and easy to implement.
- It consumes less cost and time.
- Th results are accurate.

Applications

- Used in rice producing industries.

6. RESULTS

The results are obtained using matlab software. When compared to earlier methods, the findings obtained by implementing an image processing algorithm demonstrate improved outcomes. Rice grains are fragmented and recognized using crop quality picture handling calculations. Based on the findings, it's possible to infer that using picture handling calculations to break down grain quality by size is a viable option. Damaged kernels are identified, and their quality is assessed. The principal of above method consumes less time and cost. The outcomes of this method are more reliable when compared with the results of traditional methods.

7. CONCLUSION

The primary goal of this research is to offer an image processing-based approach for classifying rice types and quality. Image processing is a crucial and advanced technological area that has seen tremendous advancements. With the advancement of computer technology and fair drop in the price of network. A number of research have been employed to assess rice appearance.

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