

"Analyzing Rice Seed Quality Using Machine Learning"

**Submitted By:
Anjali Hadke**

**Under The Guidance of:
Dr. Anupama D. Sakhre**



**Department of Electronics and Computer Science
Rashtrasant Tukadoji Maharaj Nagpur
University
Session: 2021-2022**

Abstract

Rice is the real sustenance source in India. It is the staple food for more than 80% of people around the globe. Many varieties of paddy crop are cultivated and exported. Detecting the defected grains and distinguishing rice variety is crucial in rice quality analysis. An automated system is introduced which can be used for rice grain type identification and classification where digital imaging is recognized as an efficient technique to extract the features from rice grains in a non-contact manner. Images are captured by using a camera. Image Pre-processing techniques, Filtering, Segmentation, and edge detection are performed on the acquired image. The morphological features that are extracted from the image are given to Machine Learning Algorithm and the output is displayed in LED.

Introduction

Analyzing the quality of rice is one of the vital roles in machine vision. Several researchers suggest that object shape is more information than its appearance properties such as more color vary between objects instances more than the shape. But it cannot give an accurate result. It can also identify the rice integrity problem. Rice integrity means touching of seeds while taking samples. The main purpose of this method is to offer an alternative way for quality control and to analyze the quality of rice which reduce the required effort, cost and time. The rice quality plays an important role in the production of agronomic and horticultural crops so identification of the quality of rice is very important. Image processing is a significant and advanced technological area where important developments have been made in tradition the farmers know about the rice seed quality by analyzing through the naked eye. They also have the experience to know about the various varieties. In the recent year's efforts to develop Machine vision system (MVS) for industrial application has been increased considerably owing to Availability of the low-cost electronic instruments and processing hardware. The advancement in computer technologies using digital image processing applications showed the way for analyzing the quality of food material. Rice is the major crop needed for the developing country. An automated machine that extracts information of rice using software system is more speedy, accurate, convenient, harmless and nondestructive and hence the result obtained is more precise. An algorithm can be developed to analyze the quality of the result along with the accuracy from the given samples.

Literature Review

The quality of rice is based on the two characteristics physical and chemical for evaluation and grading of rice grains. The quality assessment is done by finding the region of the boundary and end points by its measures. The average value of features is considered and they are implemented in Mat Lab[1]

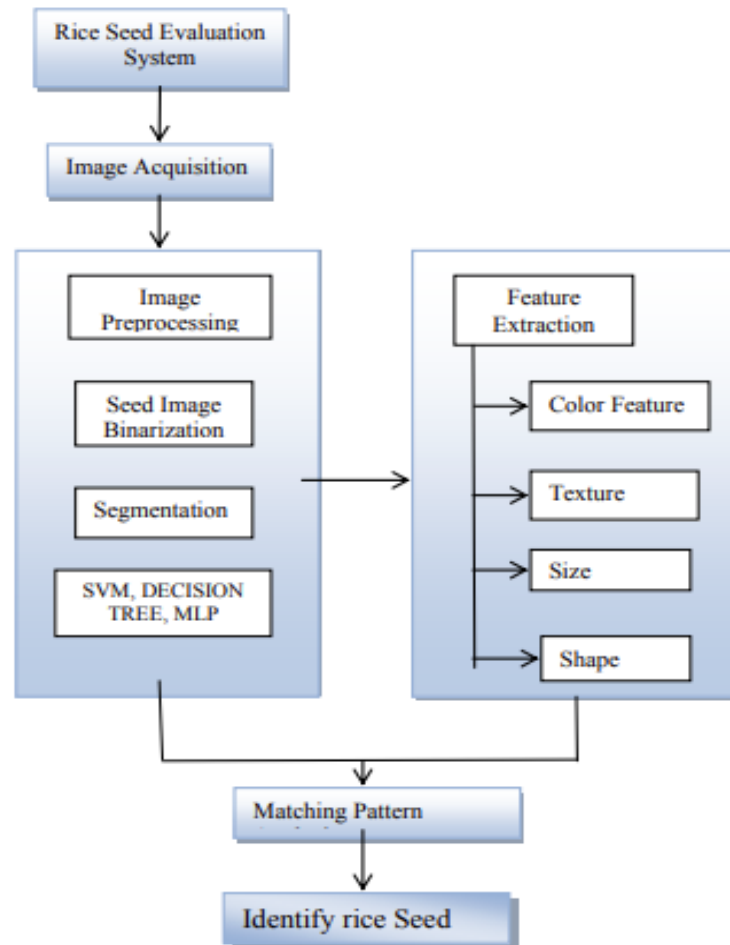
The image processing algorithm is applied over the sample grains through Mat Lab. The classification of the quality of rice is based on its color, size and shape. The accuracy and result are divided into good, bad and medium quality by Neural Network Classifiers [2]

Clustering analysis that is mainly used in the area of data mining. As that Kmeans algorithm that mainly depends upon initial clustering center and its local optimum. The forward is used first by applying the selected initial cluster to the end. The hybrid optimization algorithm and clustering algorithm is used to find the optimal cluster center .[3]

Objective

- To study about machine learning.
- To identify rice seed quality using Machine Learning.
- To analyze rice seed quality is good or bad for use.

Architecture Diagram



The working of this algorithm is shown in the below steps.

Step 1: Initially some k clusters are selected.

Step 2: Every data point is allocated to any of the k clusters randomly.

Step 3: Center of these clusters is determined and

Step 4: Distance between the center of each cluster and every data point is calculated.

Step 5: Based on this distance now the data points are assigned to the nearest cluster.

Step 6: Again the center for newly created cluster is calculated. Repetition of steps 3 to 6 is done till the center of the cluster remains the same.

RESULT AND CONCLUSION

This study focused on analyzing visual features of rice seed images such as color, shape, texture. It can be applied different classification models using these types of features. This research indicated that image processing techniques can combine with classification techniques such as MLP, SVM, and Decision tree and Bayesian network to identify rice seeds in mixed samples. All the methods using simple features proved the best capability and accuracy of classification; on average it achieved 90, 27%, 90.54% respectively. The performance can be improved by using other types of features and further investigation of classification models. It attempted to highlight the basic problems of rice industry to analyze the quality of rice grains and also highlighted the related work of researchers to eradicate the problem related to quality analysis of rice grains.

Future Work

The future work will be to correct the effects of the Non-Uniform Illumination and apply TopHat Transformation on rice grains and thus calculates the various parameters for the quality analysis of Indian Basmati rice grains so as to classify them into Normal, Small and Long rice seeds.

REFERENCES

- [1] Machine Vision based Quality Analysis of Rice Grains VidyaPatil, V. S. Malemath, Quality Analysis and Grading of Rice Grain Images, International Journal of Innovative Research in Computer & Communication Engineering (IJRCCE) ISSN 2320-9801, Vol. 3, Issue 6, pp5672-5678, June 2015.
- [2] Grain Quality Detection by using Image Processing for public distribution Qing Yao, Jianhua Chen, Zexin Guan, Chengxiao Sun, Zhiwei Zhu "Inspection of rice appearance quality using machine vision", Global Congress on Intelligent Systems, 978-0-7695-3571-5/09, IEEE 2009.
- [3] Improved K-Means Algorithm Based on Hybrid Rice Optimization Algorithm T. Kanungo, D. M. Mount, N. S. Netanyahu, et al., "An efficient K-means clustering algorithm: analysis and implementation," IEEE Transactions on Pattern Analysis & Machine Intelligence. 24, issue 7, pp. 881-892, 2002.