WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Arecanut Grading Model Using Convolution Neural Network

[1]Pramod Kumar P M, [2]Krishna Mohana AJ

[1,2]Assistant Professor, Computer Science and Engineering Department,VCET, Puttur, India

ABSTRACT

There are numerous obstacles to overcome in order to design a system for automatic Arecanut categorization using photos. Several types of Arecanut vary significantly in color, texture, and shape depending on the category and place in which they are grown. Arecanut is processed utilizing a variety of ways, with the emphasis on the product's outward appearance. The color, size, and texture of Arecanut can all be used to classify and grade it. We've also mentioned some of the major work done on Arecanut from a computer vision standpoint, as well as some other fruits. The major goal of this article is to give a comprehensive overview of Arecanut, Computer Vision, and the necessity for and applications of vision-based technologies in Arecanut categorization and grading.

Keywords—Arecanut; Grading; Convolutional Neural Network.

INTRODUCTION

Agriculture is one of the most common professions in our country. It is estimated that India's agriculture sector accounts only for around 14 percent of the country's economy.Arecanut production in India is the largest in the world, as per the Food and Agriculture Organization of the United Nations (FAO) statistics for 2017, accounting for 54.07% of its world output, and is exported to many countries. Karnataka produces 62.69% of the areca crop. In the Coastal area of Karnataka, most of the people grow areca as a major crop. Areca is one of the crops which needs manual work other than machine work. Growing of this crop includes many processes like plantation, irrigation, fertigation, providing fertilizer, harvesting the yield, separation of the fruit from the bunch, sun drying, storage, and transportation, dehusking and segregating. All these processes cannot be performed through machines. In the areca growing, huge capital is required for the labor cost. It may be for the maintenance of the crop or segregation of the areca nuts into grades. It is a time-consuming task, so we have developed a model using convolution neural networks for the segregation of the arecanuts into Grade 1, Grade 2, Grade 3 and Grade 4.

LITERATURE SERVEY

Bharadwaj N K, Dinesh R, N Vinay Kumar worked on Classification And Grading Of Arecanut Using Texture Based Block-Wise Local Binary Patterns

The proposed approach makes use of global textural feature viz., Local Binary Pattern for feature extraction. Initially, an image is divided into k number of blocks. Subsequently, the texture feature is extracted from each k block of the image. The k value is varied and has been fixed empirically.

Ajit Salunke and Sunilkumar Honnungar worked on Quality Grading of Areca Nuts Harvested and Processed in Goa using Image Processing and Labview

[3] Pushparani M.K, Dr. D Vinod Kumar, Dr. Abdulla Gubbi worked on Arecanut Grade Analysis using Image Processing Techniques.In this proposed system to categorize Arecanuts into different grades, we use MATLAB Toolbox. In this paper, we have attempted to find a way to sort Arecanuts using a computer vision approach. The Arecanuts differ from one grade to another based on color, size, and texture. So, the features selected for classification are color and texture. To extract color information the image is converted to HSV color space and quantized to create an 8x2x2 histogram summarizing the color characteristic of the arecanut

[4] Kuo-YiHuang worked on the Detection and classification of arecanuts with machine vision .This study aims to design a machine vision system to detect and classify the areca nut blemished with disease or insects. The technical goals are to develop an algorithm to extract the color features, geometric features, and the defect area of arecanuts; and then to classify different grades by using the features.

[5] S Siddesha, S K Niranjan worked on Different Classifiers in Classification of Raw Arecanut .In this paper, they presented a study of three main supervised classifiers, KNN, SVM, and ANN for classifying the raw arecanut using color histogram and color moments as features. Experiments were conducted over arecanut image dataset of 800 images across 4 classes. Among these classifiers, K-NN gave a good result of 98.16% with the color histogram as a feature.

[6] H. Chandrashekhara, M. Suresha worked on Classification of Healthy and Diseased Arecanuts using SVM Classifier.This paper proposes to Classify Healthy and Diseased Arecanut images. In this paper, Healthy and diseased arecanut are done. A structured matrix decomposition model (SMD) is used

to segment the images and LBP features are extracted using the SVM classifier. Experimental results demonstrate the proposed method performs well and obtained an accuracy of 98%.

PROPOSED SYSTEM

In arecanut growing many works are being automated with the help of new technologies. We have thought of automating the process of arecanut segregation into grades based on the quality using the Convolution Neural Network. The user has to provide an image as input, after processing our model will give the grade of the arecanut whose image has been uploaded. The processing is done by sending the image to the CNN model built for image classification. As a result, the user will get a grade.

METHODOLOGY

In our project, we proposed the model that predicts the grade of arecanut based on the input image. We have created the dataset for training the model. Our model is going to take image input, will extract necessary features from the image then compare with the dataset given and will classify to which grade it belongs to.

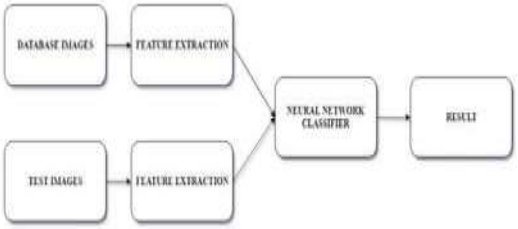
Figure (1.a) System Architecture

Dataset

There was no existing dataset available for arecanuts. So we created the dataset by capturing the images of different arecanut in different angles. In the dataset each grade consists of 400+ images. We used Convolutional Neural Network and InceptionV3 Algorithms. Our model will classify arecanuts into four grades they are:

Flow Diagram

The system has stored images by which the user can select the Arecanut whose grade is to be detected. After selecting/browsing the image by the user the feature extraction is carried out by the system and using a neural network classifier the grade of the Arecanut is detected.



RESULTS

Our model takes arecanut image as input from the user. User uploads the image from his computer using the GUI as in the figure (2.a).

Figure (2.a). Home Page

The model will process the input image and extract the features and predict which grade the arecanut belongs to. And displays the output image and its predicted grade as in figure (2.b).

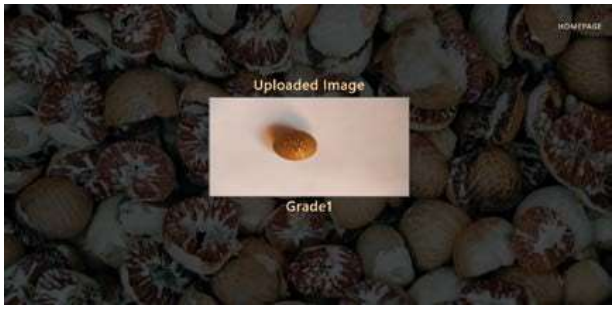


Figure (2.b).

CONCLUSION

Sorting arecanuts is a time-consuming and laborious process. Human sorters can only sort a few arecanuts per minute, which means that it can take hours to sort a small batch of arecanuts. In contrast, a real-time sorting unit can sort arecanuts much faster than a human, which means that it can help the farmer sort arecanuts in no time at all. In addition, a real-time sorting unit can sort arecanuts with higher accuracy than a human, which means that the farmer can save time and money by using a real-time sorting unit instead of human sorters.

References

[1]. Bharadwaj N K, Dinesh R, N Vinay Kumar "Classification And Grading Of Arecanut Using Texture Based Block-Wise Local Binary Patterns", Turkish Journal of Computer and Mathematics Education, 27 March 2021.

[2]. AjitSalunke, Sunilkumar Honnungar, "Quality Grading of Areca Nuts Harvested and Processed in Goa using Image Processing and Labview", AIP Conference Proceedings, July 2020.

[3]. Pushparani M.K, Dr. D Vinod Kumar, Dr. Abdulla Gubbi, "Arecanut Grade Analysis using Image Processing Techniques", International Journal of Engineering Research & Technology, 2019.

[4]. Kuo-Yi Huang ``Detection and classification of arecanuts with machine vision", Computers and Mathematics with Applications, 2011.

[5]. S Siddesha, S K Niranjan, "Different Classifiers in Classification of Raw Arecanut", International Journal of Engineering and Advanced Technology (IJEAT), Aug 2019.

[6]. H. Chandrashekhara, M. Suresha, "Classification of Healthy and Diseased Arecanuts using SVM Classifier", International Journal of Computer Science and Engineering, Feb 2019.

[7].]AjitDanti, Suresha, "Segmentation and classification of raw arecanuts based on three sigma control limits", Elsevier Ltd., 2011.