Grading of Cashew Nuts on the Bases of Texture, Color and Size

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Abstract: This paper presents a novel defect of cashew nuts based on color and texture features with K-Nearest Neighbor algorithm. The Support Vector Machine (SVM) is used for background removal and color classification. Physical recognition of defected cashew nuts is very time overwhelming. These days, most existing cashew nuts superiority detecting and grading system have the drawback of low efficiency, high cost, complex and low speed of grading. Although color is not commonly used for defect segmentation, it produces a high discriminative power for different regions of image. This approach thus provides a feasible robust solution for defect segmentation of cashew nuts. Image processing gives solution for the automated cashew nuts size grading to give precise, dependable, unfailing and relative information apart from handling large volumes, which may not be achieved by employing the human graders. This will have a good aspect of application in fruit quality detecting industries.

Keywords: Image processing, support vector machine, defect segmentation

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I.   INTRODUCTION

The naked eye observations of experts are the main approach adopted in practice for detection and identification of cashew nuts defects. But, this requires continuous monitoring and management of experts which might be prohibitively increases the expensive in large farms. Further, in some developing countries, farmers may have to go long distances to contact experts, this makes advisory experts too expensive and time consuming and moreover farmers are unaware of non-native defects. In order to improve the cashew nut's quality and production efficiency and to reduce labor power, it is necessary to research non-destructive automatic detection technology. Cashew nuts non-destructive detection is the process of detecting fruits' inside and outside quality without any destructive, using some detecting technology to make evaluation according some standard rules. Now-a-days, the excellence of cashew nut, i.e, texture, color and size and cannot evaluate on line by using traditional methods. With the development of image processing technology and computer software, it becomes more efficient to detect cashew nuts' quality by using MATLAB[8]. At present, most existing cashew nuts quality detecting and grading system have the disadvantage of low efficiency, low speed of grading, high cost and complexity. So it is significant to develop a high speed and low cost cashew nuts size detecting and grading. Appearances are a major factor in the judgment of quality and human eye has historically done this.

The color of cashew nuts indicates parameters like ripeness, defects, damage etc. The qualities areoften inconsistent. Theadaptation of human eye to small changes in color of cashew nut and the effect of the background on the perceived color and color intensity are the main sources of error[10]. Employingnon-destructive sensing techniques in fruits industry assure the quality and wholesomeness of fruit. This could increase consumer satisfaction and acceptance, and enhancing industry competitiveness and profitability. Various non-destructive sensing techniques have been studied and implemented for predicting internal/external quality of fresh cashew nuts. This paper presents an efficient image segmentation approach using K-Nearest Neighbor technique based on color features from the images. In this paper applications of grading of cashew nuts is carried out. In this K-Nearest Neighbor classifier and MATLAB is used for features extraction. In the cashew nuts grading, it required cashew nuts image segmentation after segmentation calculate healthy and infected portion of cashew nuts.

II.   LITERATURE REVIEW

J.Ramprabhu and S.Nandhini[1] have proposed fruit detection system. The system takes Msp430 scontroller as main processor and develops the fruits size detecting program using image processing algorithms. Kavita Joshi, Amruta. A. Aware[2], have proposed crop detection and automatic spraying of herbicides. The system using image processing to identify the weed and the crop and wavelet transform is used to extract the texture feature of the crop and weed images for classification. Hongshe Dang, Jinguo Song, Qin Guo[3] have proposed fruit size detecting and grading system based on image processing. The system takes ARM9 as processor and develops the fruits size detecting program using image processing algorithms on the QT/Embedded platform. Authors in [4] have proposed system which finds size of different fruits and accordingly different fruits can be sorted using fuzzy logic, and proposed MATLAB for the features extraction and for making GUI. John B. Njoroge. Kazunori Ninomiya. Naoshi ondo and Hideki Toita [5] have developed an automatic grading system using image processing where the focus is on the fruit's internal and external defects. Image processing is used to analyze the fruit's features; size, color,shape and the grade is determined based on the features. The developed system is built from a combination of advances designs, expert fabrications and automatic mechanical control.
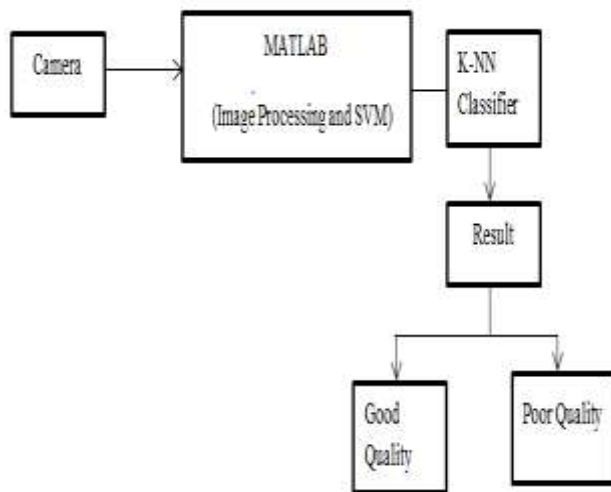
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CREATION OF GENERALIZED BLOCK:

Figure 1: Block Diagram for grading Cashew nuts

Block Diagram is necessary to examine overall operations of the solution. In this camera taking the photo of the cashew nut and feed in MATLAB where image processing using soloman map detection for shape detection and texture is detected by extended histogram. It provide the result if cashew nut is of good quality or poor quality to the classifier which compares the stored database of cashew nuts with the result form the MATLAB and gives the final result is the cashew nut is good or poor.

IMAGE PROCESSING:

The scopes of objective are to develop a complete system to undergo color detection before quality grading of the cashew nuts by digital image. The whole system will be undergoes real time analysis as possible submission.

The image could be captured using a regular digital camera. The system arrangement is done as shown below the basic aim is to obtaining the cashew nut's features. The system consists of steps like feature extraction, sorting and grading. As proposed in, to avoid shadow, two annular lights are used to supply well- distributed light[6]. The black background color in image is easier to extract the fruit edge characters later[11]. So the background is set black in whole process of image capture. The light and camera location is as shown in Figure 2.
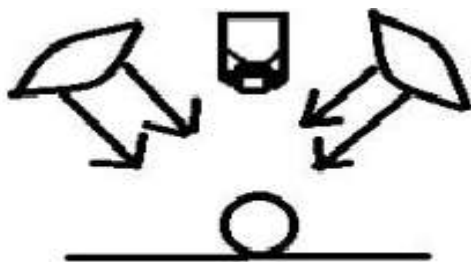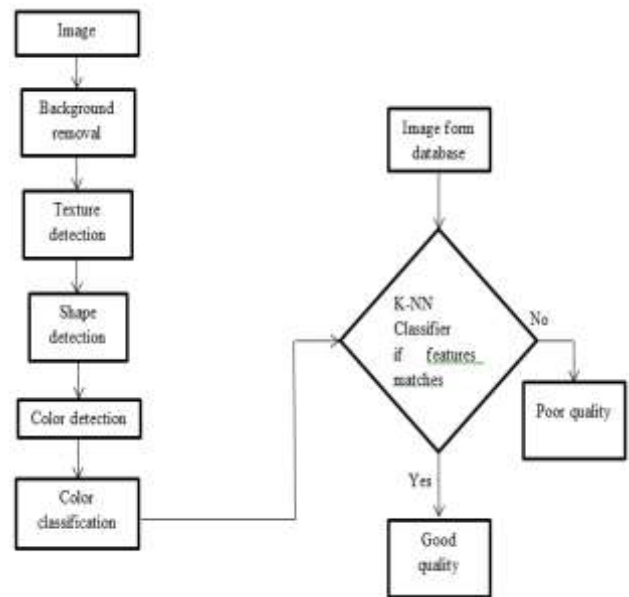

Figure 2: Conveyor

The capture image is given to the Matlab which examines cashew nuts and grade them into good and poor quality.

FLOW OF PROCESS:

The process of cashew nut quality grading is as follow:

- Texture Detection
- Color Detection
- Shape Detection
- Cashew nuts grading

III.   RESULT

The color is detected, there is need to find the texture and size of the cashew nuts. The size of the cashew nut is determined by Edge Detection and the texture is determined by Grey level co-occurrence matrix method.
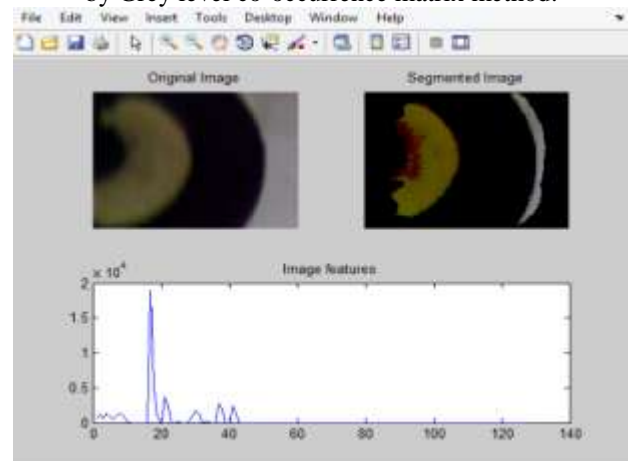

Figure 3: The processing of the cashew nut in MATLAB
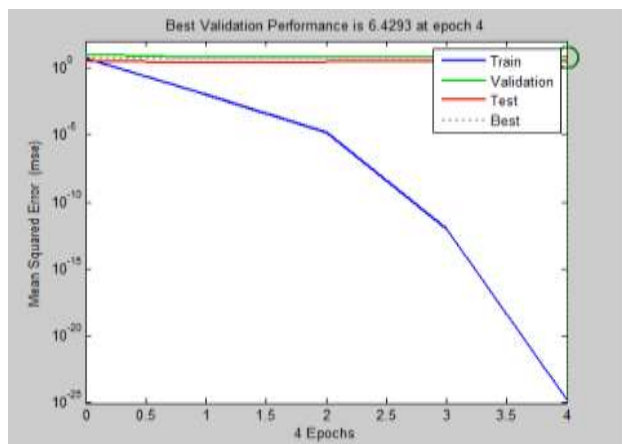
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For good cashew nut graph should be

Figure 4: Resulting graph

IV. CONCLUSION

This paper presentsnew integrated techniques for grading of cashew nut. Generally image capture is a bigchallenge as there is a chance of high uncertainty due to the external lighting conditions, so theadvantage of gray scale image is taken into account, which are less affected to the externalenvironment changes as well as beneficial for finding the size of a cashew nut. The variability of the agricultural objectsmakes it very difficult to adapt the existing industrialalgorithms to the agricultural domain. This algorithm can be used for smart self-service scales. Further MATLAB coding will be identified for different images of fruit in order to improve the efficiency.

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