

## QUALITY DETECTION SYSTEM FOR FRUITS

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### ABSTRACT

*The ability to identify the fruits based on quality in the food industry is the most important technique. Automatic fruit sorting machine is used in order to reduce the work and the human interaction can also be avoided and to reduce the cost and improve the quality of the fruits. Fruit recognition techniques are developed based upon colour shape and odour. However, different fruit images may have similar colour and shape. Hence, using colour and shape analysis are still not robust to identify and distinguish fruits. In this proposed system it is used to analyse the fruit quality with high accuracy using image processing.*

**Keywords:** *Fruit quality detection techniques, Image Processing.*

### I. INTRODUCTION

India is a agricultural based country. Export of agricultural products yield good profit for the country in which one of the agricultural products are fruits. Different fruits have their own benefits and there are some seasonal fruits which are available in particular season. Exporting such kind of fruits need quality assurance. The food processing industries use only the processed fruits. Before any processing of fruits first the quality analysis of fruits must be done. Traditional method of quality analysis of fruits was manually done but the main disadvantage of this method is, it is time consuming process and requires more labours, in turn it increases the labour cost. Manual grading and sorting of fruits can only be done for limited quantity of fruits. This method causes large delay in the export and food processing, by the time the complete batch of fruits been analysed it leads to poor quality of fruits. The fruits may be defected or rotten which will hinder the profit. In order to overcome this problem an automated fruit quality detection system is used with the image processing technique and artificial neural networks. In selection sort algorithm is written in order to sort and grade the fruits based on its texture, shape, colour and size. Based on all the collected data bases can identify the quality of fruits whether it is good or defected.

## II. PROPOSED SYSTEM

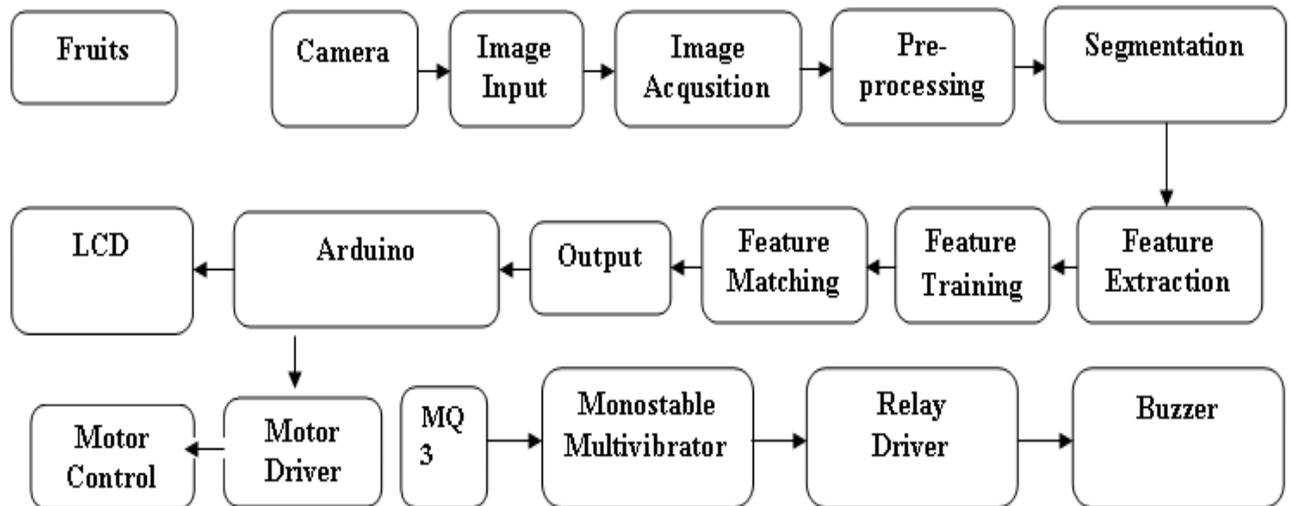


Fig 2.1: Block diagram of quality detection system for fruits

This system is used to grade the fruits based on the different texture, color size and the odor of the fruits. The fruits are graded using the image processing which uses following three steps:

1. Importing images
2. Analyzing and manipulating
3. Output

The images of the fruits are captured using the web camera and it is stored in the form of the database in the computer which is given as the input to the computer from the web camera. Once the image is captured the preprocessing operation is done which includes the highlighting of the part of the image and removing the noise from the image. After preprocessing segmentation process is done. In segmentation, the image is divided into pixels for comparison. The feature extraction is done to reduce the dimensions for comparison because only the part of the image is to be compared which is required. Feature extraction can be done using the numerical programming environments. The feature training is given to the computer to identify the different types of the images with the technique of comparison with preloaded images. After the feature training the fruits which are moving on the conveyer belt their images will be captured and it will be compared with the images which are preloaded during the feature training by comparing it pixel by pixel.

The output is indicated on the LCD with the help of arduino.

The odor sensor which is placed beside the conveyer belt gives the indication that if any rotten fruits are present on the conveyer belt. And also the flapping technique can be used to segregate the fruits which are good or bad.

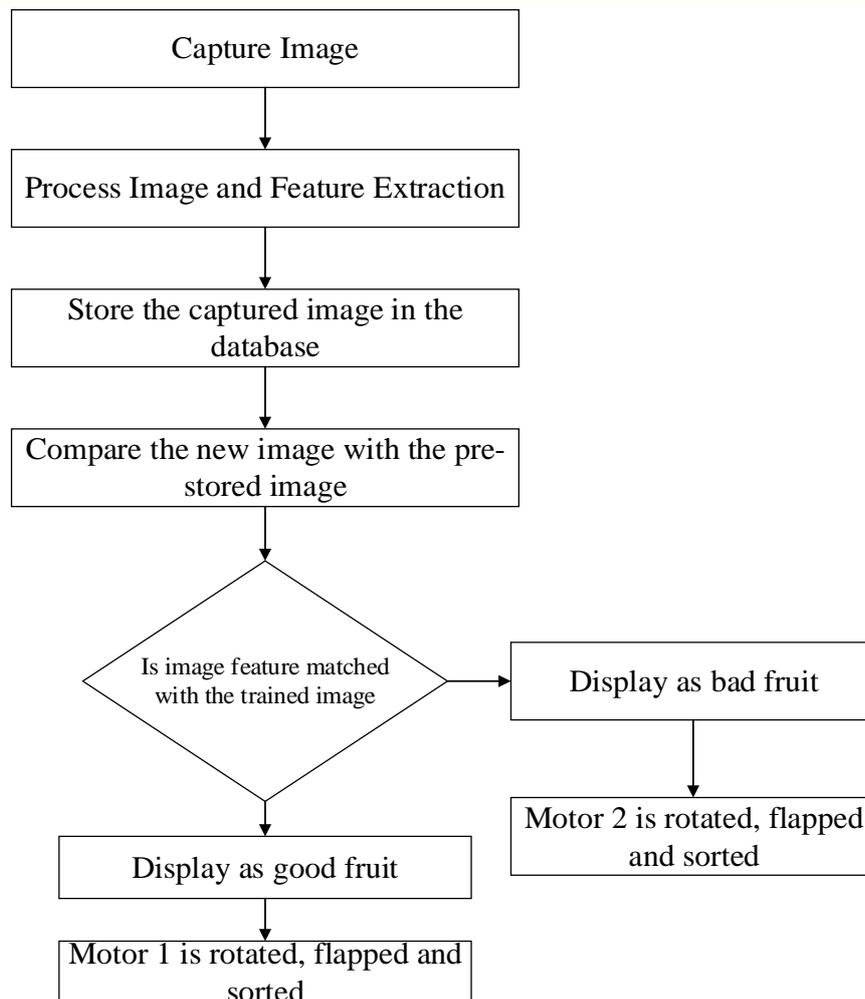


Fig 2.2: Flow Chart for the quality detection system for fruits

Figure 2.2 shows the flow chart of the proposed system. The image of the fruit is captured by the web camera and different features are extracted and stored in the database.

Both the good as well as the defected fruit is first trained and stored in the database. When a new fruit is placed in front of the camera it captures the image of it and its features are extracted from it and compared with the pre-stored data base.

If both the pre-stored and the new image are matching or same then the motor 1 is activated and rotated. By rotating the flapping is done.

If pre-stored and the new image are not matching then motor 2 is activated and rotated and by this flapping is done.

### III. ADVANTAGES

- Manual interruption can be avoided so that labor cost can be reduced.
- It is more efficient.
- It can be possible to sort the fruits based on shape, color and quality.
- The accuracy is more than the manual picking for the sorting of fruits.

- Heavy marketing cost can be avoided by sorting.
- Properly graded fruits are purchased by the consumers easily without inspection.
- Grading enhances to set the good price for graded products.

#### **IV. CONCLUSION**

The proposed method can process, analyse, classify and identify the fruits which are graded according to their colour size and their texture. The main focus of the system is to conserve the time and also to avoid the human errors.

#### **V. FUTURE SCOPE**

This type of system can be used to separate the nuts and bolts in the manufacturing of nuts and bolts industry and it can also be used for the detection of any defects in the circuit boards to identify the missing holes in the board and missing paths. It can be used for the face recognition also. It can be made completely automatic in industries by using supercomputers and multiple cameras.

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