Fruits Quality Assessment and Classification Using Image Processing

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Abstract—**India is a agricultural country .The main resource of income is from agricultural products. Here farmer achieve a more products from farm but they can't get satisfied amount of price because they are not able to interact directly with consumers. There are more agents and sellers between farmer and consumers and they get more profit than farmers. In existing traditional system, farmer can't interact with consumers. The existing systems has some Disadvantages: Time consuming manual process .Third party involvement in between customer and farmers the sellers sell the item with almost three fold of the original price. No proper channel for consumers and farmers to do direct business deal To overcome the problems we are developing the new technique for quality assessment and classification .To identify degree of maturity, quality of product, analyze, classify and identify the fruit images which are selected and send into the system based on color, shape, size and features of fruits. Already existing system does not have web portal. So we are developing web portal which will used by Farmer, Agent, Customer, Government agency etc.**

This technique will used by farmer they can describe their product with features and expected price. They can directly communicate with customer hence; they reduce the time session and get more profit instead of using traditional techniques. This technique will used by customer agent and government agency for same purpose. For developing this technique we are going to use the following Techniques Java, My SQL, Apache Tomcat.

Keywords— *Maturity of Fruits , Fruit quality criteria, image filters, Image Acquisition, Sorting, Image processing Techniques*

I. INTRODUCTION

As Fruits play main role in day to day life, grading of fruits is necessary in evaluating agricultural produce. The present existing technology are also used for fruit quality managing purpose but they are not more effective. There are some disadvantages like less reliability, less efficiency and less accuracy. That's why it is necessary to develop a new technology for fruit classification those consist of high accuracy. In this project, applied image processing technique, to find the level of maturity in Fruits considering color Characteristics, size, shape. In implementing some important methods are take into consideration such as preprocessing, segmentation, binarization, analysis and identification of objects by color. The various classifiers include (SVM)

Support Vector Machine," K-Nearest Neighbor" (KNN), Probabilistic Neural Network, K-Mean classifier(KMC), Back Propagation Network Naive Byes Classifier, Linear Discriminate classifier and others are used. In the fruit classification system we are using two important steps first is Assessment and second one is Fruit Classification step.

A. The maturity of fruits is defined as following parameters

a) Color: Color is typical variety of fruit. This app measures fruit in various classes that is dark,medium,light green color of fruits. This app will allows light green color for lower quality, and medium color for medium fruit and darker fruit for higher quality.

b) Size: It measures diameter, size by (x,y) co-coordinators. Fruits size is determined by maximum diameter of fruits. It will be measured as center of the origin.

c) Shape: It will be measured for aspect ratio, roundness of the fruit.

d) Data: Some fruit images have been collected for Fruits quality System. These fruit images will be classified into high quality, medium quality and low quality of fruit. fruit images are required to be sent in and processed by the system when develop the classification algorithm for the fruits quality system. RGB Values for every fruits pixels computed by using mean function provided.

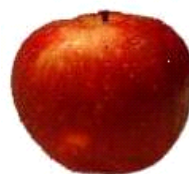*e) Training Images:*

Appendix 1 : Training Images

Fig. 1. Red Apple.   Fig. 2. Watermelon.

Fig. 3.   Strawberry.

Fig. 4.   Lemon.

Fig. 5.   Strawberry.

Fig. 6.   Watermelon.

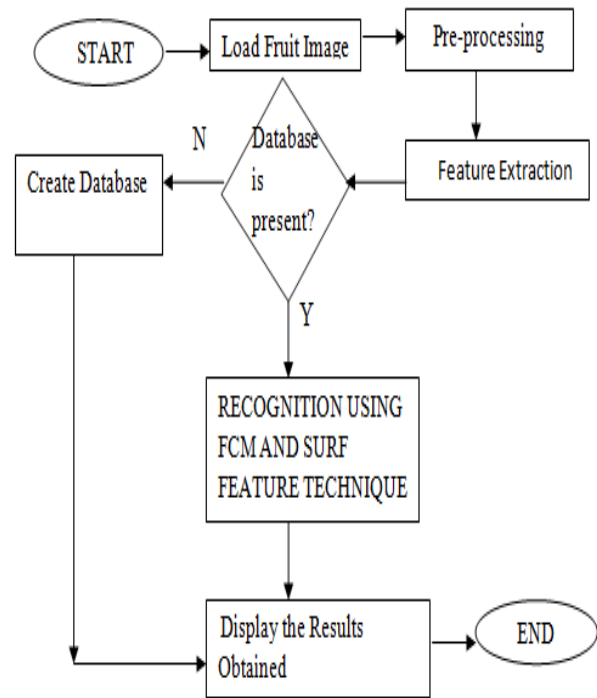Fig. 7.   Lemon.

Appendix 2 : Tested Images

Fig. 8.   Tested Apple.

II.   FLOW CHART

Fig. 9.   Flow of a State.

III.   ARCHITECTURE OF PROPOSED SYSTEM

IV.   FRUITS CLASSIFICATION SYSTEM
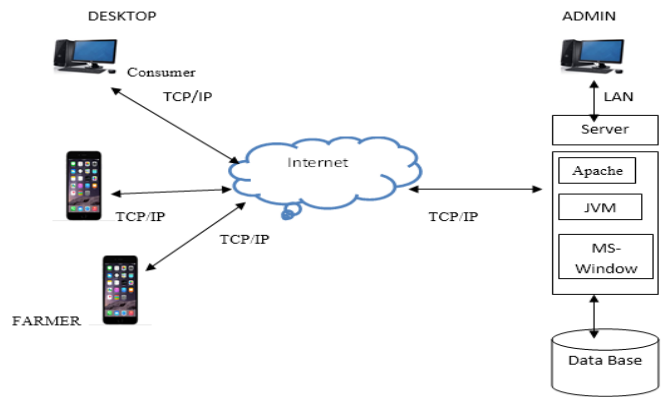
TABLE I.   RGB VALUES FOR EVERY FRUITS PIXELS

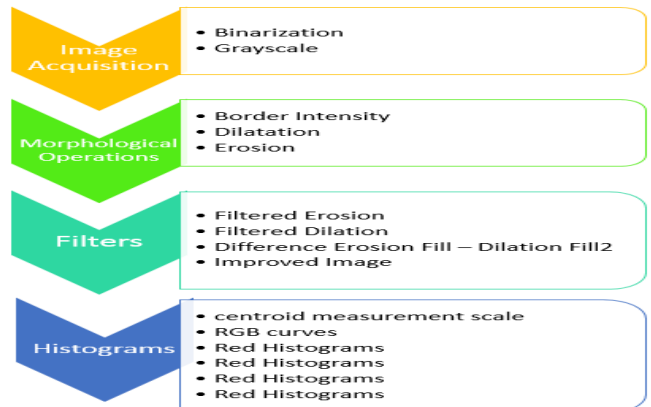| Fruit Name	Min			Min		
	R	G	B	R	G	B
Red	128.5	14.0	42.0	219.9	98.0	67.0
Green	99.0	145.0	31.0	146.0	189.0	62.0
Strawberry	158.8	21.38	28.2	233.0	56.1	58.2
Banana	168.0	145.8	53.1	251.0	234.5	56.2
Lemon	1925	148.3	17.6	252.8	218.5	129.1
Durian	84.4	67.0	22.0	197.8	172.0	88.0
Watermelon	77.8	119.9	39.7	119.6	166.4	77.7

Fig. 10. Fruits classification System.

In this project are implemented morphological operations to enhance the image characteristic and achieve a optimum image processing, are implemented techniques such as erosion and dilation. After applying the required filters to improve image quality is come to make the analysis of the photo taken to extract the relevant features to identify maturity in the fruits taking into account parameters such as color, shape and size.

The main object of analysis is the color, for which is used a RGB processing to obtain the characteristic data of the image, subsequently with the implementation of histograms is performed the classification by color in RGB space, and finally is defined parameters to selection oranges according to maturity.
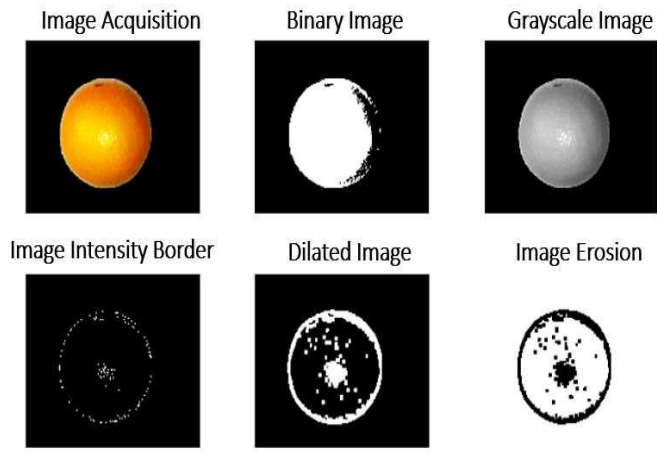
A. Digital Image Acquisition and Preprocessing

Image is acquired, is binaries and apply morphological operations (dilation, erosion and intensity of border) as evidenced.

B. Filters and Morphological Operations

At the end the image preprocessing are implemented filters to perform corrections of noise and guarantee optimum processing, as shown in Figure.

C. Histograms

In this project is performed the analysis RGB of the filtered image to obtain color parameters required for classification by ripeness, with the histogram the amount color is obtained according the RGB space, as evidenced in Figure.

D. Classification

By means of histograms the amount of color present in the image is obtained, with this information is identified ripeness in the fruit. Additionally, the area of each figure is determined to establish the optimum size of the oranges. Finally, can be displayed result of the classification of the fruit.

V. USING THE TEMPLATE

System or Paper	Performance	User Friendly	Classification of Fruit	Gap between Farmer and Consumer Reduce
24*7	×	✓	×	✓
Naturesbasket.co	✓	×	×	✓
Onlinesubjiwala.com	✓	✓	✓	×
Jagsfresh.com	✓	✓	×	×
Proposed System	✓	✓	✓	✓

Fig. 11. Taxonomy Chart.

A. Advantages

- Proper interaction between customer and farmer.
- Reduce Time session.
- Farmer satisfies with expected price.
- Customer satisfies with rate quality.

B. Limitations

- Internet Charges for Processing.
- Farmers should have Android Device.
- Need to daily update the information.

C. Applications

- The system can be used by industries and mall for Fruit quality assessment.
- Industrial automation and image processing
- Medical image analysis
- Food industry.

CONCLUSION

Thus, the various techniques are implemented and the classifiers used. The "Fruit Quality Assessment and Classification Using Image Processing" is totally new system. It can be very useful for Farmer in the agriculture field for classifying the various fruits .This new technique also very useful to find out the quality of fruits.

ACKNOWLEDGMENT

WEBSITES

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