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 and 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, and shape. In implementing some important methods are take into consideration such as preprocessing, segmentation, binarization, analysis and identification of objects by color.

II. MAIN FEATURES OF PROPOSED TOPIC

Therefore, a recognition approach for fruit images is proposed, which combines shape-based, and size- based methods in order to increase the accuracy of the recognition result with enhancement of surf feature. System recognizes provided 2D query fruit image by extracting features values, including colour, shape and size and computing extracted features values to measure the distance between the computed features values of query image with the stored standard features values of every fruit samples using java.

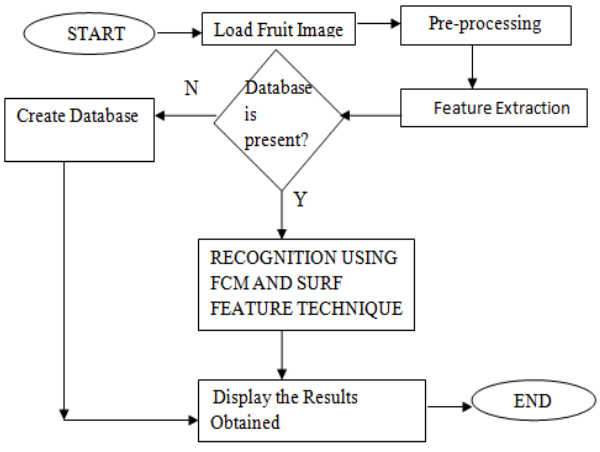


Fig. 1. Flow chart.

Algorithm:

Step 1. Start

Step 2. Upload image

Step 3. Image segmentation

Step 4. Compute shape by threshold segmentation (remove noises, morphological operations)

Step 5.Compute geometrical properties (Area, perimeter, size, shape)

Step 6. Use naïve Bayes algorithm and classify the image

Step 7. If database is present then

(a) Reorganization

(b) Display result

Step 8. Else database is not present then

(a) Create database

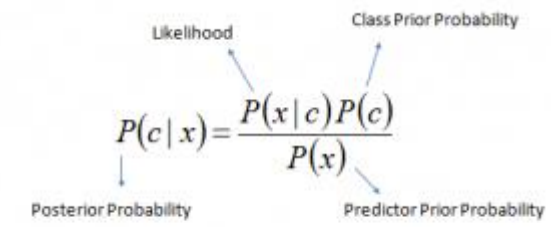
(b) Display result

Step 9. Output Result.

Step 10. End

III. NAÏVE BAYES

- It is a classification technique based on Bayes' Theorem with an assumption of independence among predictors. In simple terms, a Naive Bayes classifier assumes that the presence of a particular feature in a class is unrelated to the presence of any other feature. For example, a fruit may be considered to be an apple if it is red, round, and about 3 inches in diameter. Even if these features depend on each other or upon the existence of the other features, all of these properties independently contribute to the probability that this fruit is an apple and that is why it is known as 'Naive'.
- Naive Bayes model is easy to build and particularly useful for very large data sets. Along with simplicity, Naive Bayes is known to outperform even highly sophisticated classification methods.
- Bayes theorem provides a way of calculating posterior probability P(c|x) from P(c), P(x) and P(x|c). Look at the equation below.



$$P(c|X) = P(x_1|c) \times P(x_2|c) \times \cdots \times P(x_n|c) \times P(c)$$

Fig. 2. Naïve Bayes Equation.

A. *How Naive Bayes algorithm works?*

Let's understand it using an example. Below I have a training data set of weather and corresponding target variable 'Play' (suggesting possibilities of playing). Now, we need to classify whether players will play or not based on weather condition. Let's follow the below steps to perform it.

Step 1: Convert the data set into a frequency table

Step 2: Create Likelihood table by finding the probabilities like Overcast probability = 0.29 and probability of playing is 0.64.

Step 3: Now, use Naive Bayesian equation to calculate the posterior probability for each class. The class with the highest posterior probability is the outcome of prediction.

Weather	Play
Sunny	No
Overcast	Yes
Rainy	Yes
Sunny	Yes
Sunny	Yes
Overcast	Yes
Rainy	No
Rainy	No
Sunny	Yes
Rainy	Yes
Sunny	No
Overcast	Yes
Overcast	Yes
Rainy	No

Frequency Table		
Weather	No	Yes
Overcast		4
Rainy	3	2
Sunny	2	3
Grand Total	5	9

Likelihood table				
Weather	No	Yes		
Overcast		4	=4/14	0.29
Rainy	3	2	=5/14	0.36
Sunny	2	3	=5/14	0.36
All	5	9		
	=5/14	=9/14		
	0.36	0.64		

Fig. 3. Training dataset.

An advantage of naive Bayes is that it only requires a small number of training data to estimate the parameters necessary for classification.

B. *Advantages*

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

C. Limitations

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

D. 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

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

It gives us great pleasure in presenting the preliminary project report on 'Fruits Quality Assessment and Classification Using Image Processing'. We would like to take this opportunity to thank our internal guide Prof. Archana Gaikwad for giving us all the help and guidance we needed.

We are really grateful to him for his kind support. His valuable suggestions were very helpfull. We are also grateful to Prof. S. S. Das, Head of Computer Engineering Department, DYPSOE, Lohegaon, Pune and to our Project Co-ordinator Prof. Amruta Chitari for their indispensable support, suggestions and motivation during the entire course of the project.

In the end special thanks to our Director Dr. S. S. Sonawane who encouraged us and created a healthy environment for all of us to learn in best possible way.

We also thank all the staff members of our college and technicians for their help in making this project a successful one.

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