

REVIEW ON "AUTOMATED FRUIT CLASSIFICATION SYSTEM USING DIGITAL IMAGE PROCESSING"

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Abstract—The automatic fruit classification system is completely based on new technology. Existing some systems are used for testing the leaf and fruit. This technique is utilized for analyzing the standard of fruit. in a fruit market number of fruits are available, and testing of this fruit or classifying a broken and contaminated fruit could be a terribly tough to human. This technique is extremely use full for handling such tough task, this method automatically classify the best fruit and also the broken or contaminated fruit. This paper we proposed a plan regarding a way to distribute the fruit in step with the size, Quality, color and health. This technique is extremely use full for the framer and also the fruit purchaser. This method is completely based on image processing. This technique has high accuracy of classifying fruit and it's a really huge advantage of this technique. This technique powerfully applied in agricultural sector. Agricultural sector specially fruit cultivation. This paper has 2 units one is image acquisition and second is image processing.

Keywords—Fruit Classification; Testing of Fruit Quality; Components; Image Acquisition; Image Processing

1. INTRODUCTION

The "Automated Fruit Classification System" is embedded additionally as image processing based on completely automated system. we will use this method for classifying the number fruits like apple, orange, guava, etc. for classification purpose we will apply parameter like form, size of fruit, fruit damaging level, contaminated level and its cleanup level. using this parameter we planning to classify the fruit. this technique is incredibly helpful to the farmers. Fruit classification system may be a entirely automated and because of that it save the precious time of the farmer additionally as the traders and customers. this technique reduces the labor intensity and will increase the standard of the fruit. This system classify the fruits with no damage as a result of this we planning to use some normal rule of DSP and Image process. the current existing technology is also used for fruit quality managing purpose however they're less effective. they need some disadvantage like less dependability, less potency and fewer accuracy. That's why it's necessary to develop a replacement technology for fruit classification those accommodates high accuracy, high dependability, and low price. Here we've 2 decisions for classification purpose, one by exploitation the color of the fruit and second is by mistreatment the dimensions of the fruit. the primary one is beneficial for distinguishing the color of the fruit, color of the fruit is employed for classification purpose as a result of some fruit are yellow, Some fruits are red in color likewise which means all fruit don't seem to be in same color. because of that we take into account color of fruit for classification purpose. other is size, size are used because of all fruit don't seem to be in same size and shape our existing system are used circular shape for grading. this technique is software system

primarily based that's why software designing is vital task likewise as choosing proper algorithm for designing software. Our system is DSP and Image processing based that's why total designing is based on MATLAB. MATLAB is extremely powerful toll in DSP. Here grading is categories into four ways that Red little, Red big, green little, Green big. we tend to use the fruit like Apple and Tomato for industrial purpose.

2. LITERATURE REVIEW

A lot of analysis has been done on the fruit sorting and grading system. VON BECKMANN and BULLEY (1978) states that co-occurring fruit sorting by size and color would save time, reducing fruit handling. For the larger variety of the fruits, color is associated to the physiological ripeness, and might be used as a sorting pattern.

ARIAS et al. (2000) report that the surface color of tomato may be a major consideration in determining the ripeness of this fruit.

VAN DER HEIJDEN et al. (2000) and POLDER et al.(2000) conjointly compared images with standard RGB images for classifying tomatoes in several ripeness categories using individual pixels and obtained similars results.

Polder et al. 2002 used principle element analysis (PCA) in conjunction with spectral imaging to grade tomato fruits according to their ripeness level.[9] thus commodities in today's world, need to be checked for the images from the side, to cover the whole fruit surface unattended methodology for in-line standardization, that may be a

necessary demand for real time sorting of tomatoes on compound concentration using spectral images .

3. METHODOLOGY

Our system is completely machine-driven and embedded based due to that our system needed many hardware and one very well, error free developed software (KNN coding). Hardware like ARM7, 4 Cameras, IR sensor, DC Motor, conveyer, power supply, LCD, Dc motor Driver, GSM Module, PC etc. Let observe the block diagram of the our projected system. This block diagram terribly helpful for understanding the really what's "Fruit Quality Classification System". Figure one is the block diagram of consist above mentioned material. All the hardware like DC motors, IR sensors, LCD, GSM module area unit interfaced to the ARM7 with the assistance of DC motor driver. LCD Module, camera and IR sensors also are interfaced to the ARM7. IR sensors area unit used for sensing the fruit is present on the conveyer or not. If fruit is present on the conveyer then the system goes to begin for additional process. we will additionally interface the GSM Module to the present system for recoding Purpose.LCD used for showing purpose it'll display the entire weight of the fruit. This are the vital material we going to use in this system. we will use the microcontroller like ARM 7 or ATMEL 32 and different appropriate material those have good quality and better stability, potency and reliability.

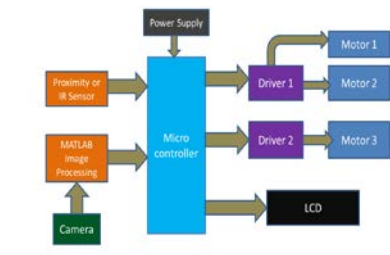


Figure 1: Block Diagram of System

Methodology used in this system is detecting the size of the fruit and the colour of the fruit. According to the above mentioned part we require a algorithm for calculating the size and identifying the colour of that particular fruit. This algorithm is given here.

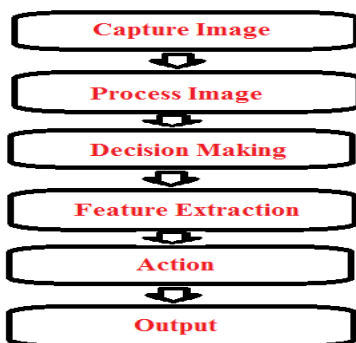


Figure.2: Fruit Colour and Size Detecting flow

A. KNN Algorithm

A nearest-neighbor classification object, where both distance metric ("nearest") and number of neighbors can be altered. The object classifies new observations using

the predict method. The object contains the data used for training, so can compute re substitution predictions.

The k-Nearest Neighbors algorithm (or k-NN for short) is a non-parametric method used for classification and regression. In both cases, the input consists of the k lowest training examples in the feature space. The output depends on whether k-NN is used for classification or regression.

Example of k-NN classification. The test sample (green circle) should be classified either to the first class of blue squares or to the second class of red triangles. If k = 3 (solid line circle) it is assigned to the second class because there are 2 triangles and only 1 square inside the inner circle. If k = 5 (dashed line circle) it is assigned to the first class (3 squares vs. 2 triangles inside the outer circle).

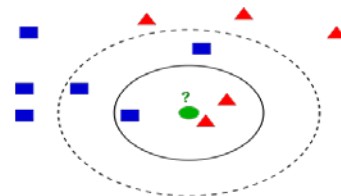


Figure 3: Example of k-NN classification[10]

B. Manual Grading

The method used by the farmers and traders to variety agricultural merchandise is through conventional quality inspection and handpicking that is time-consuming laborious and less economical. Manual grading was carried out by trained operators WHO thought-about variety of grading factors and fruit were separated per their physical quality. Manually grading was expensive and grading operation was affected because of shortage of labor in peak seasons.

C. Machine vision system for grading

Grading and sorting machine vision system contains feeding unite, a belt conveyor to convey the fruit, a color spectral camera situated in an image acquisition chamber with lighting system for image capturing, control unite for open and close gates as per signals from computer unite and a computer with an image frame disagreeable person to process the captured image

4. RESULT

In the fruit classification system we use 2 necessary steps 1st is color detection and 2nd is Fruit edge detection step. In color detection we get the particular color of the fruit and second step used for obtaining the particular size of the fruit. In edge detection step the original image converted in to grey image and gray image is extremely helpful for sleuthing the sides of the fruit. In edge detection there are much technique however we are going to use KNN algorithm.

5. CONCLUSION

"DIP based fruit quality management system using k-NN algorithm" is completely new system. That's why it'll be extremely useful for in the agriculture sector for classifying the number of fruit. we going to design the system for

industrial purpose. we will implement this system in massive scale additionally, we need to extend the length of the conveyor belt and also the range of Cameras.

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