Fuzzy Logic System to Determine Fruit Quality

Jajala.Mohith Kumar, KirupaGanapathy

Abstract: ***Nowadays the production and consumption of food has increased very vast. The buyers and sellers are getting the food products without any proper checking their quality. So because of this there are many lot of health issues has been rising up daily. The farmers are using many chemicals and fertilizers in order to ripen the fruits. Those fruits will be very harmful for any purpose. So these days a new technology came to existence in order to check the quality of the fruit before it reaches the market. This module comprises of various sensors like aroma sensor, water level sensor and aroma sensor to check the quality of the fruit. All the sensors are impressed on a WSN which consists of IOT. This works by a wifi module in order to get the output for the personal mobile or laptop.***

Keywords:WSN, Fruit, IOT, Sensor.

I. INTRODUCTION

Production of food had become a worldwide important these days.. Actually in before days the fruits in the market will be coming from the various farmers which will be ripened by using many chemicals and those fruits will be very harmful for eating or making of juices.

The people of the society will buy those fruits without any prior notice that they cause damage to their own health. Those fruits which were swollen by people and get many health problems, they will go to hospital frequently. The olden days of selling fruits became a habit that they will sell or buy the product without checking the quality of it. Many fruits will be in damage and they look beautiful by outside but inside the fruit will be not good, some fruits will have no water content and it will be full soild like structure and not good for eating. Some fruits will be too smelly and some were will be still not ripen from inside.

In order to overcome all these issues my project gives a solution to buy good quality fruits.My project gives an exact indication for fruits that will be in market. The quality like sweet, water level, aroma and texture will be exactly measured by the equipment in order to reach the customer requirements. Most of the factories required specific quality in order to make the sub products of the fruits.

In this project there is a classifications based on fuzzy that the different types of quality is graded. Here the grading is of fuzzy based and it helps to classify as less quality or medium or high instead of normal Boolean value like true or false.

The normal datasets will be of UCI repository values that will be taken from any industrial requirements in order to save as a read command in the program to reduce the size of the source code Because of this technique a lot of pressure will be reduced and easy to identify the errors in the code for the immediate rectification of errors .

This project gives the exact quantity of how much water level, how much aroma and how the smell of the fruits is coming, so the customer gets the exact quality of fruits which they needed. The input of the type of the fruit will be collected from the data sets or it will collect directly from the web by using wifi module. By using this method we can reduce lot of coding to preprocess the input image.

Deducting the quality of the fruit like papaya and mango. Now a days latest technology provides easier way for smart marketing from the farm land the fruit quality is deducted using sensors such as aroma sensor and firmness sensor. The data collected from the sensors are processed and applied fuzzy logic for fruit classification based on the quality. Then the price of the fruit is noted to the dealers.First the data is collected from the sensors and is converted from analog to digital by using A/D converter and then the digital value is sent to single data packet by using the communication module such as Bluetooth .The data from the single packet will be analyzed and the final output will be directed to the PC .Based on the quality of the fruits the particular order will be exported.

II. LITERATURE SURVEY

In This paper explains the robust way of harvesting fruits by using various sensors available in the market. Both apple and citrus crops will be easy to be observed by this method. The clustering of fruits will be explained. The fruit will be observed and clustered by image processing method tpo prevent more collision and mis lead of fruits. The maximum light condition to the fruit crop will be monitored.the robust way of harvesti g also explained in detail.

In [2], here the size of the fruit is observed by image processing and also grading done by the same method. The fruit will be captured first and then later the image will be used to detect any marks is present on it or not, so it was a very long process takes more time to check for entire crop.

In [3],WSN is used to be check the vegetables quality and this will be implemented by embedded system, this will be much costlier for entire quality check. Here they explained about how the process of fruit will be changed when they

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Jajala.Mohith Kumar, ECE dept, Saveetha school of engineering,SIMATS,Chennai, Tamilnadu, India.

KirupaGanapathy, Associate professor, ECE dept, Saveetha School of Engineering, SIMATS, Chennai, Tamilnadu, India.

grow for two to three months after the crop done. The embedded controls for little sensors in order to detect the sweet level and water level.

In [4], here the zigbee module is used to transfer the inputs from sensor to the cloud computing system in order to check the status of the repository sets with the particular quantity of the fruits. Later the fuzzification process is done by the mat lab code. The code detects the size and is graded later in order to sort in the type of the fruit and is specially made into separate sectors of the fruits graded on the selected range.

In[5], Here GMM technique is used to detect the quality that indicated the sweet level and smell of the fruits and vegetables. In this method the major process is on transmkitgters that will transmit the ranges of quality in separate index that is not applicable for the factory manufacturing. The continuous monitoring is a difficult process in this type so all the farmers will be not able to undergo this type of methods.

In[6],here a contemporary technique is came to existence in which the recognition technique is used to detect the which type of fruit by using processing technique. Here the diseases of the fruits can be identified by ESS layer of the fruit. The diseased part will be come in zigzag color when the fruit is scanned under this system. But large quantity fruits cannot be scanned in this system.

In[7], here the outside quality of fruit such as
Size, color and shape of the fruit will be identified by using embedded system. This has a vast demand in the field of agriculture. The farmer's and consumers are well known for using this method in harvesting crops. The harvested ctrops will be clearly scanned for the disesed fruits or to identify whether the fruits are safe for consumers or not will be indicated .

In[8], here a algorithm is used to determine the cost and specifications of the type of fruit in order to get noted to the customers that various types of fruit has various specifications. The algorithm here used was in matlab and is easy to implement the speed and accuracy. The cost and vitamins available in the particular fruit will be displayed to the consumer while buying the fruits.

In[9], here only green color and orange color fruits will be identified in algorithm that uses fuzzy logic in matlab. Fruits like green mangoes and oranges will be identified by using this algorithm, the size and shape also will be identified here, there will be dark color showing the defected area of the fruits or vegetables. The input of the fruit must be pre saved here in order to detect the type of the fruit.

In[10], This project gives the exact quantity of how much water level, how much aroma and how the smell of the fruits is coming, so the customer gets the exact quality of fruits which they needed. The input of the type of the fruit will be collected from the data sets or it will collect directly from the web by using wifi module. By using this method we can reduce lot of coding to preprocess the input image

III. METHODOLOGY

HARDWARE REQUIREMENTS:

- UNO
- WIFI MODULE
- Web Camera
- IOT
- Water level Sensor
- Aroma sensor

SOFTWARE REQUIREMENTS:

- Arduino IDE
- C

IV. WORKING PRINCIPLE& RESULTS

Here the aroma sensor, water level sensor and sweet sensor are inserted in the basket of fruits and the values are noted. The noted values will be converted into digital later the digital inputs will be sent through IOT module by the help of WIFI. Later the values will be fuzzified and classified based on their grade and it will be compared with the data sets of the specific company and the final quality check report will be released. A camera will be used to recognize the fruits.

BLOCK DIAGRAM:

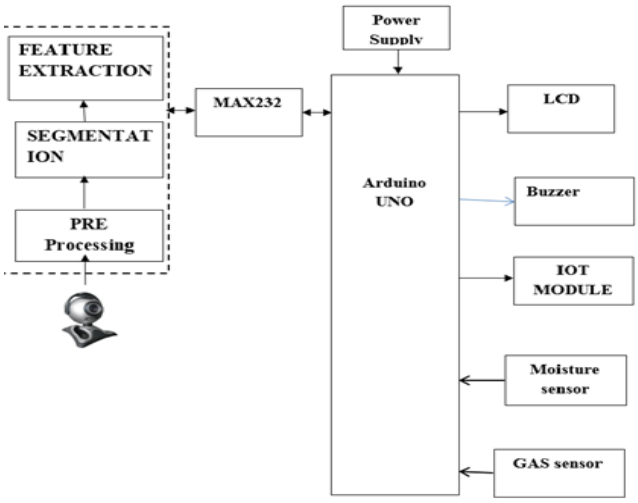

fig1:- Block diagram

V. CONCLUSION

All the sensor inputs are taken and is sent to the A/D converter and then; later by the help of wifi module the digital input is sent to IOT module. The IOT tally the repository set values with the values obtained by the sensors. A web camera detects the type of the fruit, so it makes the buyer easy to recognize the quality of fruits and the Wi-Fi module helps in sending the quality check message to the buyer as well as seller.

The output comes in the range of Fruit Quality Index.so the range values from 1-10 to be sufficient for the company or factory to recognize.

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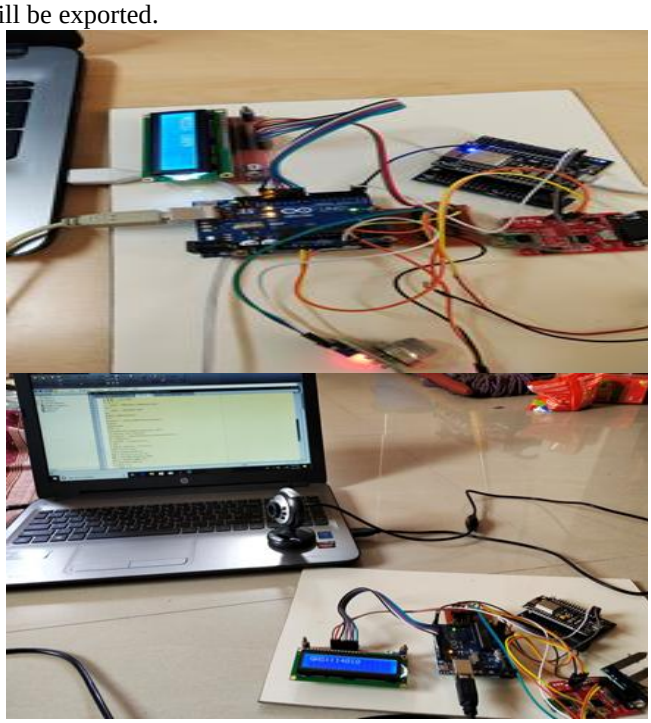

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