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Automated Food Quality Technique Using Electronic Nose System

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Abstract
Abstract: In today's society, provisions processing industry is massive part of individual occupation be it in a straight line or not directly. Maximum food dispensation industry does still depend on shortest human being involvement. Central processing unit idea provides a solution designed for a computerized, non-destructive and money-making technique to achieve the requirement of determining food quality. This scrutiny comes within reach of based on reflection investigation and dispensation has established an array of special applications in the groceries manufacturing. The Embedded system consists of microcontroller, sensors, a camera and a conveyor belt setup. After capturing the food image, some characteristics are extracted by using detecting algorithms. The data collected about the quality along the storage environment condition of food is sent over the cloud based on Internet of Things, to notify in real-time which enable to take appropriate measures.

Keywords: *Image Processing, Controller, Neural Network, IOT, Heart Food samples, Chemical sensor*

I. INTRODUCTION

In Present situation everyone is getting automated and manual interface in the system becomes economically and non-economically solution as well as time consuming task. The extent of industry automation depends a great deal on type of food application the automobile and semiconductor applications are represent the most mature in adopting detection of food quality principles with all process have been automated as well as integrated in embedded applications [1].

The food application increased quality and safety because in many events and temples some time it is difficult to check the quality food makes mandatory the use of E-nose system for food in order to improve the food quality and efficiency also reduce labor intensity detection is a process of identifying inside and outside quality of food items, without any damage using E-nose system technology to make evaluation accordingly some standard rules [2].

Now days many people's they are depend on the cook because they cannot evaluated some methods with image processing technology it becomes more attractive to detect the food quality by using E-nose system at most presently more existing quality and grading system so it is significant to develop high quality food low cost and high speed to detecting and chemical grading system [3].

Embedded application concept of integrating several physical things within the secure environment currently many embedded

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application they are using like environmental, military etc the main contribution of this work is check the quality food and also estimate nutrients. Integration of sensor through inaccessible network services used for data lagging with a software purpose will check the dangerous chemicals data because healthy as attentive communication is the require of the hour the actual instance user announcement instrument is also necessary to make sure instantaneous protective achievement [7].

Representation investigation are acknowledged as individual the center of supercomputer visualization image process involving with the aim of improve the superiority of an representation in order to take out overcome such inappropriate center individual nose mixed chemicals and camera motion [10]. Deep knowledge is a completely repeated device knowledge advance achieve situation of the art consequences in a give to most effective for the task of image reorganization [8, 9].

II. RELATED WORK

Similar situation is seen in preparing grocery food which has got a massive ware house to source the food produce they employ hundreds of workers to perform monitoring process on a daily basis as a result they are not able to check any chemicals added in the food also not able to maintain consistency in food cost, also manual labor is unpredictable also the conditions can damage the quality of food if not monitored accurately. This can lead to heavy problems in the temple and any events for food [6].

In particular food processing they proposed multiple variety of food like rice, any sweets etc [4, 5]. in the most of the events cases the checking quality of food is depends on the human or labors at the same time if they are food quality technique using E-nose system is very efficient to check the quality of food figure 1.

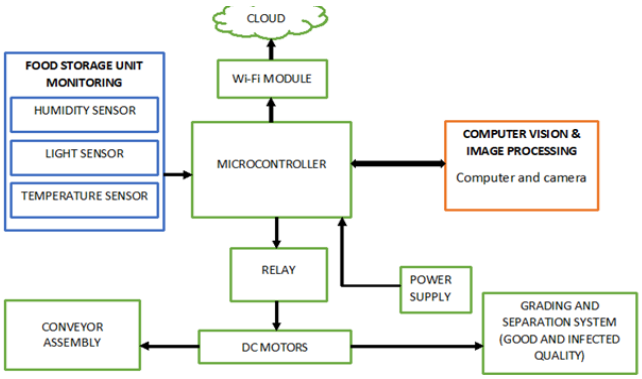

Figure 1. Automated food quality E-nose system

III. Explanation of E-nose system

Image processing: - Reflection is a collection or an environment of rectangle pixels approved in a column and row basic mechanism are controlled in every pixel, intensity and locality coordinate are prearranged to the descriptions. Image processing is a further and additional significant position in the provisions quality and evaluate by maintain correctness and for any inspection figure 2. Show in categorize to increase a computerized food quality technique using E-nose system.

Figure 2. Object image detection

Digital Camera:- The digital image camera capture a valid representation and transfering keen on a digital reflection by means of device such as a camera and scanner. A digital reflection is a arithmetical reprentation of a representation with the aim of preserve be computationally process figure 3 shows the apparatus be supposed to be positioned more than the conditions at a distance 25cm.

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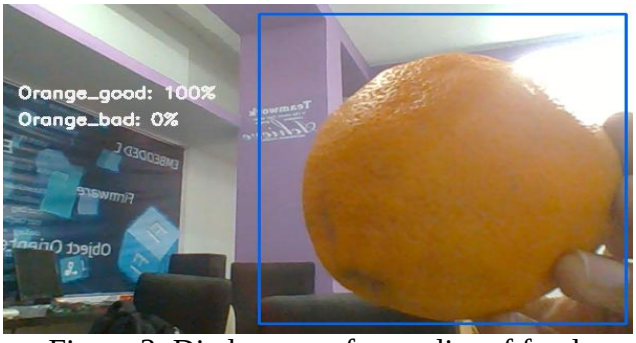

Figure 3. Dital camera for quality of food

Scanning:- Images are scanned to look for surface defects shape abnormalities.

Grading:- based on the scanning process the feed item is assigned a quality grade.

Collection:- based on the grading the food items is routed to a specifiec conveyor and collected in a basket assign for that grade shown in the figure 4.

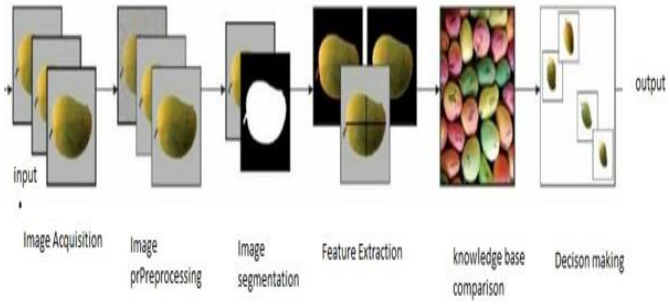

Figure 4. Grading, scanning and collected process

MCU ESP 8266 display module:- The display module is a safe contained systen on chip with intergated TCP\IP ptotocol stack that can the wireless communication is capble of whichever hosting an appliance every one wi-fi networknig function shows in the figure 5 from another application processor.

Figure 5. MUC display module

Sorting system:- The vision based sorting system consist of different system figure 6 shows the different component of the sorting system fast single camera are used to capture the image of the food products the captured image are sent to the system to be processed and analysed in real time the decision are passed are failed sent an E-nose signal to embedded interfaced circuits these circuite drives an volue will open or close the path of the product store finally the quality of food only will continue to pass stores.

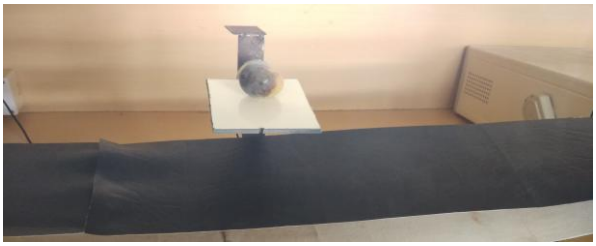

Figure 6 sorting system

Sensor: - The humidity and temperature sensor. The DHT11 sensor made up of 2 major apparatus - 1 is clamminess sense element furthermore additional is negative temperature coefficient sensor. The Thermostat is in reality a changeable resistor to change determiner resistance by means of modifies in temperature figure shows 7.

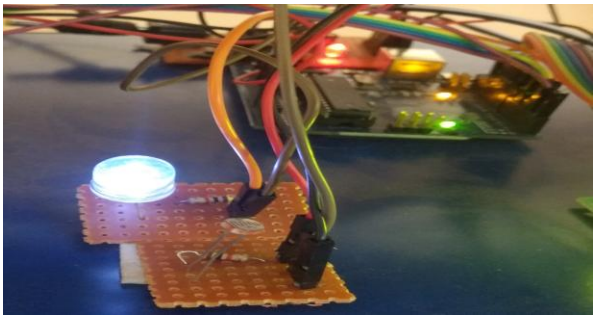

Figure 7. sensor

Artik Cloud:- The artik cloud is a self contained software that can give full information about the food quality and what are ingredients mixed in the food and computer storage real time data and digital data stored in the logical pool, control smart devices figure 8 shows it will start talking device in within seconds.

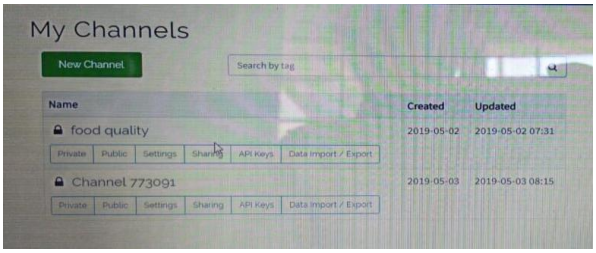

Figure 8. Things to speak

MQ3 Sensor – volatile and non volatile chemical detector sensor element be use to sense the

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attendance of ethanol, anywhere the responsive substance second-hand used for this sensor is SnO2; associated conductivity is inferior during hygienic atmosphere. Its conductivity increase as the attentiveness of ethanol gases increase. It has elevated sensitivity to alcohol and has a high-quality opposition to instability due to smoke, breath and gas. This section provides together digital and analog output. It has a far above the ground compassion and fast reaction time. Sensor provides an analog resistive output based on alcohol concentration. MQ-3 is an analog as well as digital sensor. The incidence of ethanol fumes in food is a signal of decompose. So, by MQ3 sensor, it can be detect if food has in progress decomposing.

IV. Experimental Results

E-nose system for different food products quality monitoring and each food has its stand alone designed and developed system. A data sets of 500 images is use to train and test the vision based system the size of images 240*180 pixels figure 9 shows a sample of images are good or bad products of sets.

The chemical detection stage is applied on a small scale image processing the remaining of the processing use with main image size 240*180 to detect the all details.

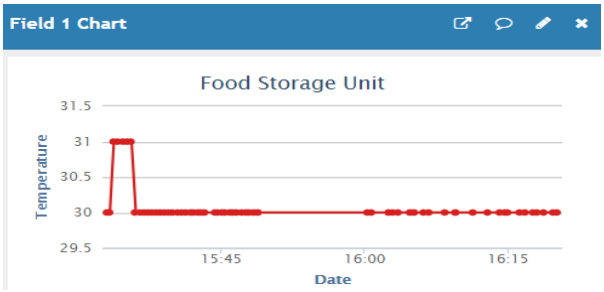

Figure 9. field chart

Reflection segmentation submit to the development of separating into region by some charcterstics the target of interest detecting the food quality. The main problem with segmentation is the seletion of threshould shown in the figure 10 & 11. Selection of the threshould based on the histogram.

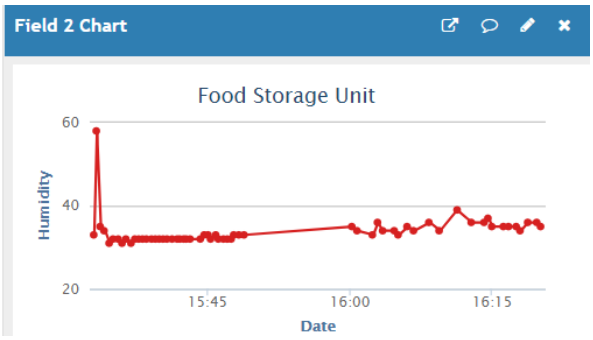

Figure 10. Food storage unit

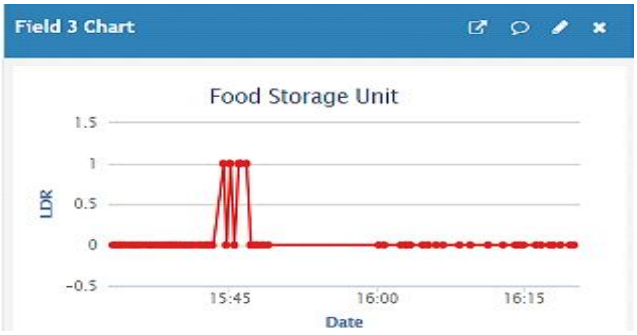

Figure 11. food quality field chart

Table 1 reports the accuracy and quality of the system for different products these valus are measured after processing the system with intel core processor.

Table 1. Accuracy of food quality

Product	Accuracy	Quality
Mango	96%	112%
Rice	97%	110%
Jack fruit	96%	120%
Orange	97%	110%
Banana	97%	112%
Leman	96%	190%
Water Melon	97%	100%

V. CONCLUSION

Food quality management would be most imporatnt factor of food quality monitoring like fruits and riceb etc. through improved hope of high excellence and security in any events and temples prasad the proposed system reprents method os detecting and identifying chemicals through illustration dispensation which include capture of image dispensation and anlysing the quality of foof method. This development not simply aim to sense the excellence of food items,

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but it also create the awerness of food quality during preparing food and serving of food using automatic food quality technique using E-nose system.

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