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QUALITY INSPECTION RAW FOOD AND FRUITS USING IOT AND IMAGE PROCESSING

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Abstract--*Recent trends in technology have made it possible for the stakeholders in agricultural sector to develop their products and provide advanced services. A positive transition from proprietary to IoT-based, open systems to make collaboration between stakeholders more efficient is underway. The technical support for application developers to start specialized services that connect seamlessly. This approach includes to create an advanced and tailor-made environment for end users. Our proposal is to incorporate an architecture that initiates this approach on the basis of the" common enabling" domain independent framework built under the FI-WARE project. This application is used to test other creative ideas, such as the idea of the market place of the services and the adjustment of network failures, for the agriculture industry. The evaluation results show that the program is appropriate and that farmers need access to sophisticated facilities at an accessible price. The evaluation results The applications, hardware and IoT technologies are included.*

Keywords--*Plants,Greenery,Drip,Filtrate Enrichment, IoT, MATLAB, Arduino UNO, Wi-FI,.*

I INTRODUCTION

Reduce labor intensity to increase the quality and productivity of the past development fruits. Non-destructive identification of fruits is nothing more than process of identifying fruits without harm in and out of their condition, using detection technology to test according to some traditional laws. The quality of the fruit cannot now be assessed on-line using traditional methods as the volume estimate. Through enhancing the image processing and internet technology, computer soft ware and hardware, the recognition of fruit quality using machine vision detection technologies is more attractive. In terms of efficiency, hand inspection and low grading speed, high costs and complexity, the most current detection and grading system for fruit quality has many drawbacks.

If we are sorted in the circular shape, color and size are determined by the fruits. Three processes such as feature extraction using GLCM are combined in an automated classification, volume estimation, and classification system, according to color and size.The development of software is extremely important for the use of classifier and fruit size in this color classification system.The whole device has been designed with the support of the MATLAB software to inspect the color and size of the fruit, Arduino UNO has built hardware and Iot Module displays the overall sensor monitoring.

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Figure 1: Fruit and Vegetables

II RELATED WORK

In the [1] application, Prof. S.M. Shirsath, Mr. SumitS.Telang proposed to inspect fruit and vegetable quality and fruit grading in agriculture and food industry.

In [2] Manoj B. Avhad ,Satish M. Turkane I suggested that embedded systems benefit from high grading accuracy, high speed and low costs. This system has the best possible application in the detection and classification fields of fruit quality.

In [3] AkshayDeshpande ,J.K.Singh Describe a summary of current machine view inspection literature, where the framework used mostly in estimating diverse quality-related properties is analyzed with image analysis. The expertise and accurate classification method in agriculture is extremely important to increase the yield of the crop.

EXISTING SYSTEM

The existing system uses only base sensors and 8051 microcontrollers. 1.The following sensors are DHT11(i.e.)Humidity Sensor & Temperature Sensor. The sensors detect the soil water content, the conductivity level and the motor is used to pump the water. This device gathers camera frames on the belt to cover the garden area. The image manipulation is performed using GLCM, texture and dimension to achieve the necessary fruit characteristics, such as surface characteristics. Rotten fruit is found non-effectively on the basis of blob detection, pattern identification is performed on the basis dimension detection and thresholding is centered on binary fruit pictures.

III PROPOSED APPROACH

In this project, Farm house maintenance is achieved using the Arduino Microcontroller and MATLAB vision software. The microcontroller Arduino UNO that helps irrigate the plant by the water. 1.Temperature sensor 2, the following sensors are used. 3. Moisture sensor for soil and 4. Leading Republicans. The soil Moisture Sensor to detect the moisture content of the soil in order to prevent water conductivity (i.e. water) If the soil content is found

to be wet then Arduino commands the motor to be at off state which means pump is turned off. And whenever soil is found to be dry then Arduino commands the motor to pump the water. Using image processing technique we can recognize insect damage to the blade

IV BLOCK DIAGRAM

A. Biometric Unit

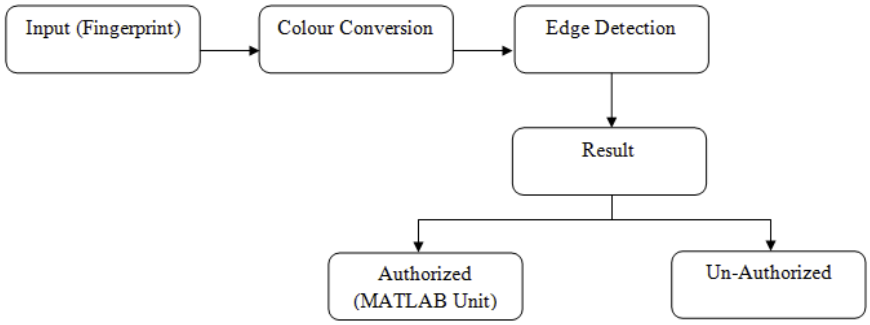

Figure 2. Biometric Image

B. MATLAB Unit

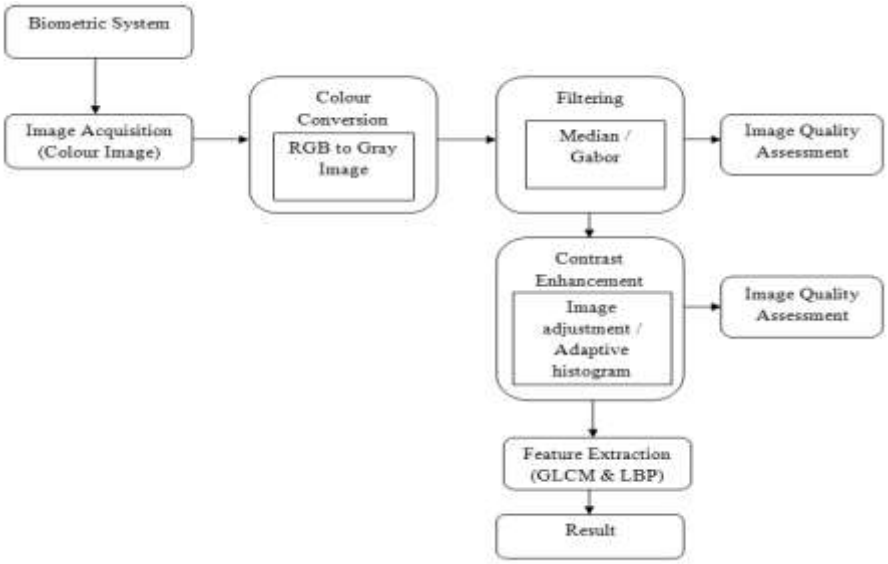

Figure 3.MATLAB unit

C. Hardware Unit

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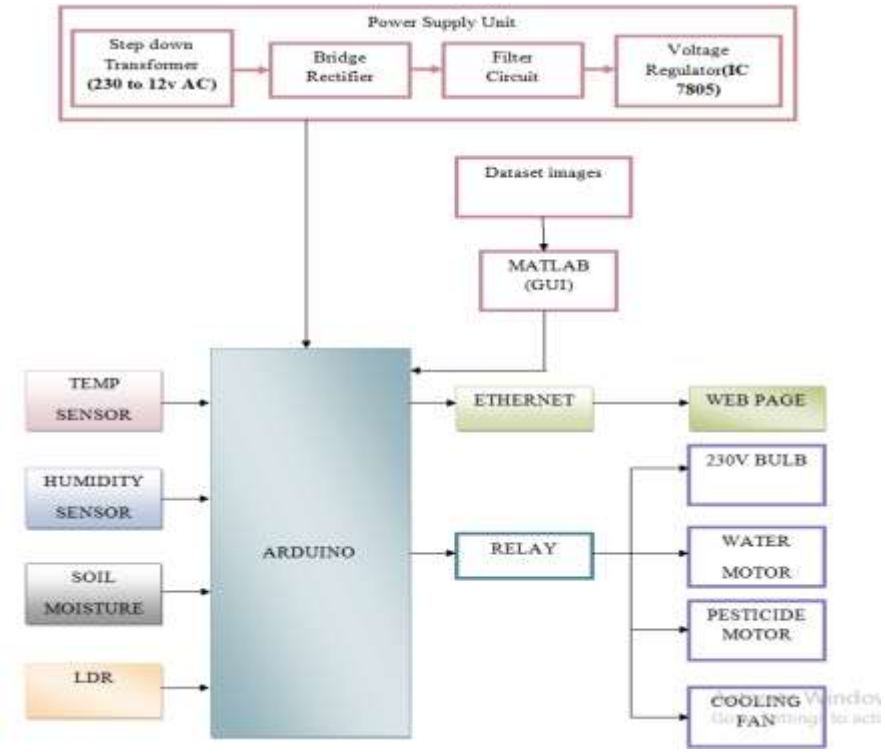

Figure 4.MATLAB unit

V DESCRIPTION OF MODULES

A. Base Image

The color model of RGB (road, green and blue) is a red, green and blue lights in which a range of colors is combined in various ways. At the beginning of the three major additive colors, red, green and blue, this brand name originated. RGB is a color model dependent on it; different single devices detect, or create, an RGB value differently, as colors or reactions to individual Red, Green and Blue levels vary between users or even in a single device over time. The RGB is a colour-dependent model. Red Green and Blue values therefore do not represent the same color over devices without any color control. Three beams will combine to form a green, blue and red. Each of the three beams is called a colored product and each can have a better intensity in the mixture, from full to full.

Fig.ure 5. Input Image

B. Gray Image

A digital gray scale and gray scale image is an image conversion type in photography and computer technology where the value of each pixel is one measurement, i.e. it contains information only on the intensity values. Images of this kind, also known as grey scale images, are only combined with gray shades, which vary from white to black to black to white.

Figure. 6. Gray Scale Image

C. Filtration Process

It is a process or technique used to process a signal which removes a needless component or feature of the signal. Filtering is a processing of the signal, image or frame, the characteristic characteristics of the active or passive filters is a total or partial deletion of the signal elementIt is among the un-linear methods of optical filtering used to remove distortions out of a signal or an image and unwanted distortion. Such a noise reduction is a standard step in the processing of edge sensing findings such as canny, sobel. Median filtration has been used in the image processing assessment to erase noise from the main 2D image. During noise reduction, it prevents edges, and also broad applications for image processing. The filter's key concept is to stage by stage transfer the signal, replacing each input with the nearby input median.

Figure. 7. Median Filter

D. Contrast Augmentation

Augmentation is a methodology or approach for the image-transformation using histogram. Histogram equalization by increasing the diffusion of the highest intensity levels to transparent blurred. Adaptive histogram equalization (AHE) is a type of digital image analysis and machine display technology used to enhance contrasting signals or images. The system calculates many histograms & makes use of them to reduce the un-darkness values of the image. Adapted approach tailors the values of pressure. This is different from other histogram equal treatments

Figure 8. AHE

E. GLCM

The function production methods start from the initial measurement data and establish functional extract values intended for information in the field of machine learning, recognition algorithm and image processing. The extraction of features applies to quantitative analysis focused on dimensionality reduction.

Table 1 Feature Extraction using GLCM

GLCM	VALUES
CORRELATION	0.94
CONTRAST	0.19
ENERGY	0.164
HOMOGENITY	0.9222

VI HARDWARE DESCRIPTION

A. POWER SUPPLY UNIT

The power supply panel is a guide to the power supply. A power supply unit or PSU is called a system that supplies energy in any way for the output charge. This term is usually used mostly for supplies of electricity, less rarely and often mechanically. The basic energy supply is connected to the main winding of the input power transformer. The electrically insulated secondary winding is used to produce the alternating current voltage of
from separate diodes or use a combined bridge rectifier (2W10). Through splitting the circuit into two parts, the first component is the capacitor and the second is the low pass filter, a filter circuit can be understood. Each one of these components produces effects in order to remove the remaining AC pulses. the desired amplifier. After

further processing by the power supply unit, the electronic system drives the electronic circuit. Circuit rectifier is used; the Alternate Current input is converted to Direct Current. It is possible to build the bridge rectifier from separate diodes or use a combined bridge rectifier (2W10). Through splitting the circuit into two parts, the first component is the capacitor and the second is the low pass filter, a filter circuit can be understood. Each one of these components produces effects in order to remove the remaining AC pulses.

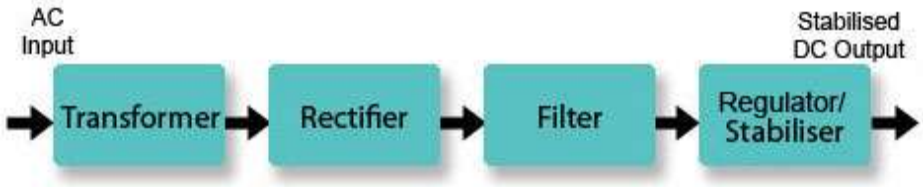

Figure 9. Power Supply Unit

B. ARDUINO UNO

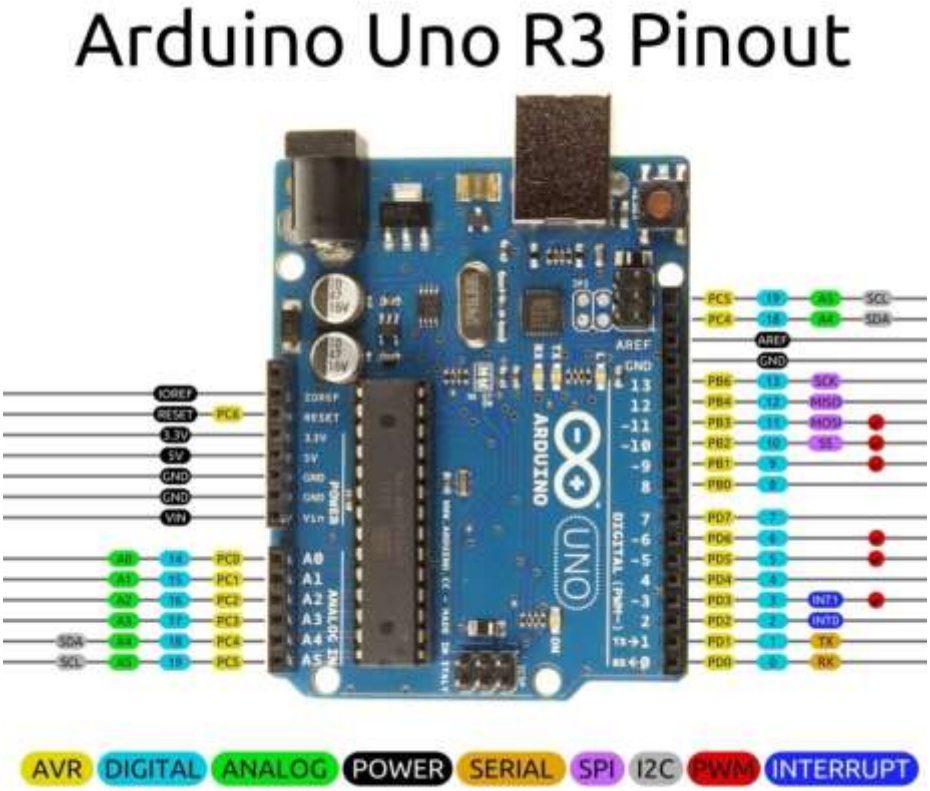

Figure 10. ArduinoUNO

A UNO Arduino is a device built-in microcontroller package that can be used by the hardware components directly from the computer. The Arduino Uno is an integrated system-based ATmega328 microcontroller board. There are twenty pins. 14 optical input / output pins and six analog inputs are included. It includes everything necessary to support this kit of a micro controller; just connect it to a PC with a Universal Serial “B” uscable or power it to a new current or battery adapter.

C. TEMPERATURE SENSOR (LM 35)

Temperature in industrial automation is the calculated process component. LM35 is used in the electrical converting of the temperature value. In industrial automation applications temperature sensors are the device for reading temperaturesand controlling temperature.

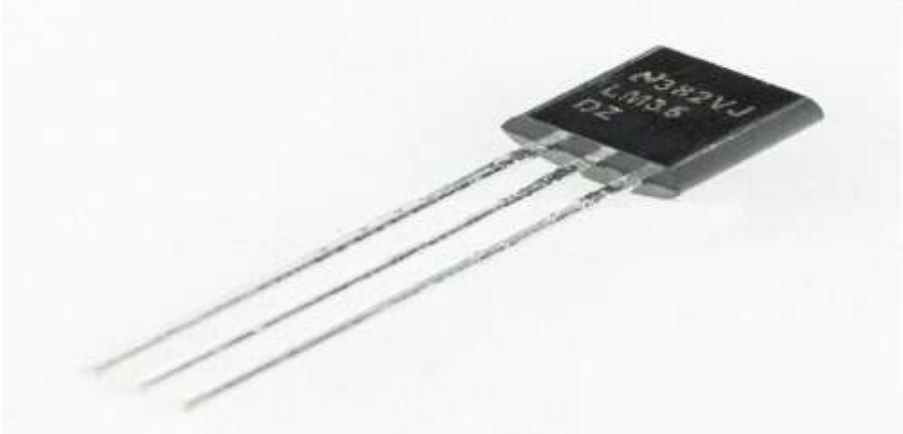

Figure 11. Temperature sensor

D. HUMIDITY SENSOR

A humidity sensor is a meter used in a medium. Humidity is calculated. A humidity monitor can be used and implemented both indoor and outdoors. Digital and analog signals are available

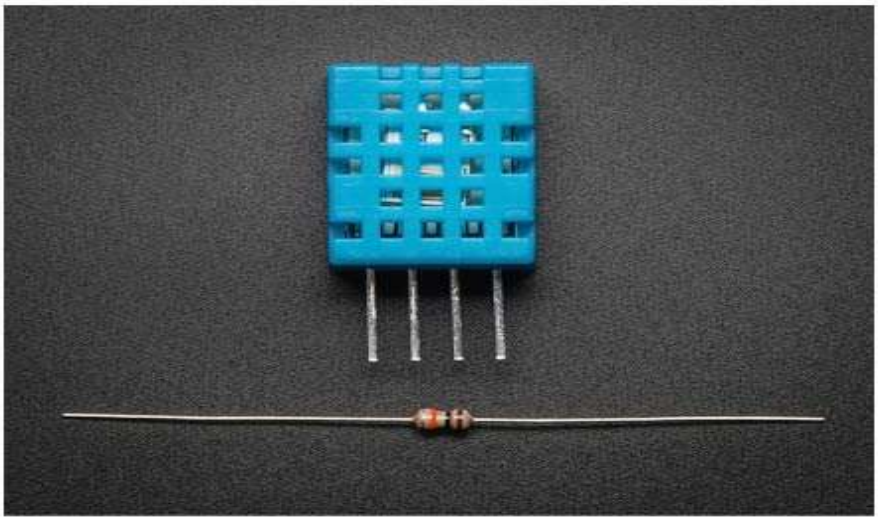

Figure 12. Humidity Sensor

E. SOIL MOISTURE SENSOR

The soil's humidity sensor, which enables the soil moisture content to be determined to prevent water conductivity (i.e.) reduced soil water content.

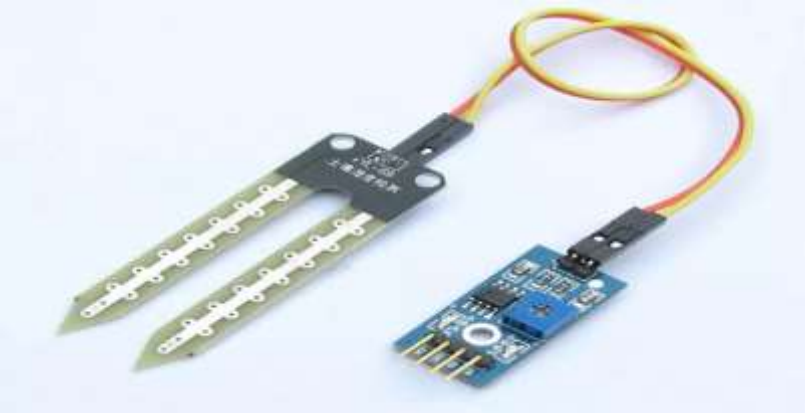

Figure13.Soil Moisture Sensor

F. RELAY

A circuit can be operated by the relay. The channel relief systems need to be powered by electric motors, and so on. The power generator can be used to operate a variety of circuits such as engines, fans, and 230v bulb. Relais are simply switches which are functional. Such relays are called contactors. Switch-based relays are an electromagnet and a set of contacts as well. With the aid of the electromagnet the switching process begins. Nonetheless, their implementations vary.

Figure 14. Relay.

G. MOTOR

A DC motor is the machines that convert DC electric power into mechanical power.

Figure 15. DC Motor

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H. Figure 16. Water Motor

I. BUZZER

A buzzer is a warning system audio signaling device. A buzzer arranges the input and gives a sound. They can use different methods to create the sound, from metal bangers to electromechanical appliances.

Figure 17.Buzzer

J. SERIAL PERIPHERAL INTERFACE

The data interface bus of Serial Peripheral Interface is a synchronous interface specification used primarily in hardware based embedded systems for short distance communication.

K. ETHERNET SHIELD

A board Arduinouno was assembled for the Arduino Ethernet Shield R3 to connect to the internet. The Wiz Net W5100 provides both the Transmission Control Protocol as well as the User Datagram Protocol to an Internet network (IP) stack. Up to four links are allowed. To write sketches, which connect to the internet via the shield, using the Ethernet libraryarduino function.

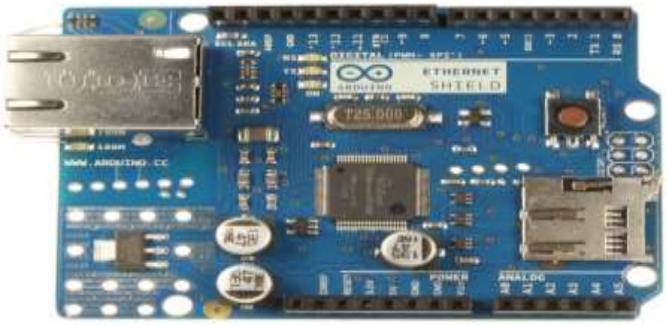

Figure 18. Ethernet Shield

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L. LDR

An LDR is a device with a resistance (variable) that modifies and monitors the intensity of light it contains.

Figure 19. LDR

VII RESULT AND DISCUSSION

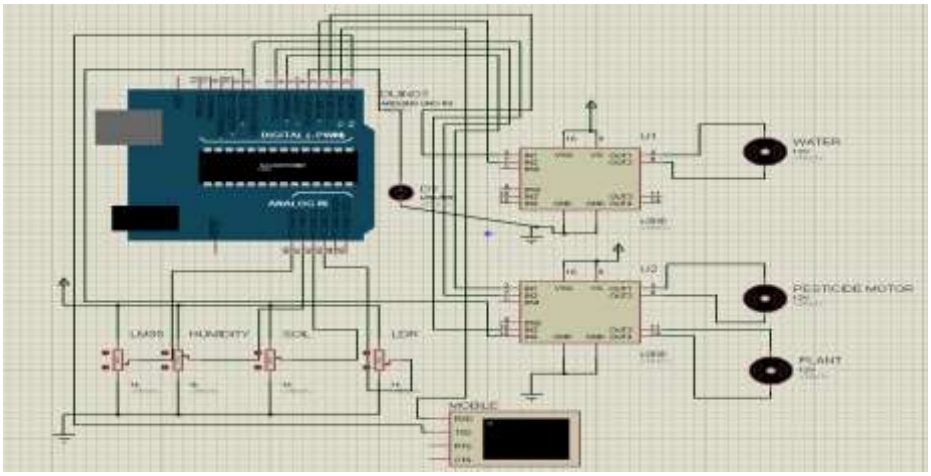

Figure 20. Simulation Output using Proteus 7

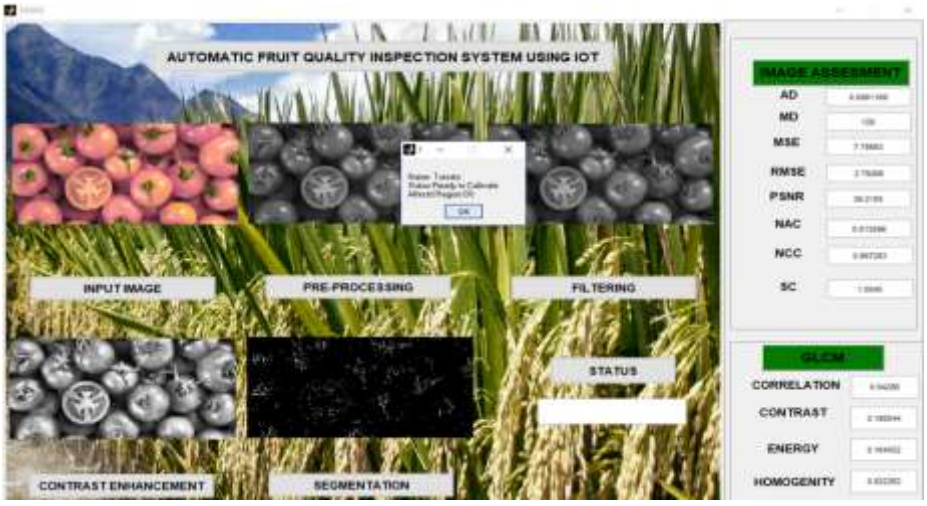

Figure 21. MATLAB unit

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VIII CONCLUSION

The system proposed is a combination of software and hardware, so that cameras and the length of the conveyor system can be modified for a large scale garden production. This paper provides standardized methods to arrange and grade various foods and fruits. Image capture in general is a major challenge and decision process as there are high levels of confusion due to external lighting conditions we benefit from the gray image that is user-friendly to changes to the external environment and useful for finding a food and fruit scale. The same thing happens when the conveyor system collects fruits or vegetables by means of a mainplate. Weight variability in food and fruit measurements can thus be modified to allow for healthy harvesting of fruits. By using Arduino UNO for the sam reasonspeed and efficiency of a machine can be further improved.

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