

Maturity of Fruit Identifier by using TCS 3200 Sensor



S. Chitra, T. Siva Kumar, S.Nandha kishore

Abstract: As we all know that India is an agricultural country here agriculture is a big part of the economy. So this industry plays very important role in Indian economy. As this is a huge industry so it need a large number of human effort. So to reduce that human effort and to increase the production we have to go for automation. For considering these things we are making this project. For identification of color we are using TCS 3200 sensor. This sensor has four LED's with it which will emit white light on the object. Then object will reflect those rays towards the sensor which is situated in between those four LED's. Now with the help of its construction and design sensor sense the color of the object. Here we have used raspberry pi as a controller which has been programmed previously for taking the actions. We are using python language to program raspberry pi.

Keywords: Colour image processing, Python language, Automatic system for packing.

I. INTRODUCTION

In this project we are going to make a process automated which defines the rate of production and that is picking the mature fruits from the storage. Normally for this process we are putting human effort which is a time taking process but if we can make that thing automated then we can increase the production rate a bit. This will be helpful in the country like India where agriculture is a huge part of economy.

II. EXISTING SYSTEM

In existing system we are selecting fruits manually. We need some manual effort along with the machine. That process is not as much accurate as this process is. Because humans may do mistakes but machines do not do. It takes more time compare to proposed system.

III. PROPOSED SYSTEM

The proposed system will be almost fully automated. Here we are using motor mechanism to separate the raw and mature fruit. Here we are implementing two motors for the separation of both types of fruits.

Here we will going to identify the fruit is matured or not by using colour sensor and also we will separate it. In this, we will identify the fruit colour based on that we will fruit is matured or not and then we will push it into two different boxes i.e. one is matured fruit another one is not matured fruit box. Here we are trying to reduce human efforts and save time

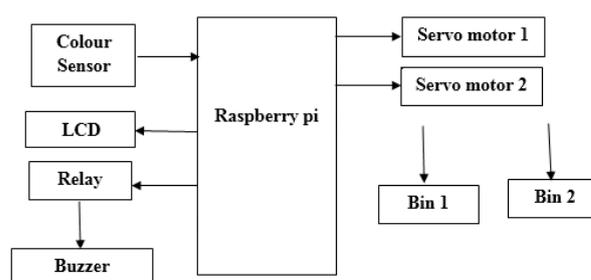


Fig1: Block Diagram

Working principle:

Switch ON the power supply for Raspberry pi which in turn drives the motors, LCD and Relay which is connected to buzzer. Fruits which are to be sorted are placed and the colour sensor will detect them and process the data to the raspberry pi. If the fruit is in red colour then it is ripe fruit and the signal is processed to the Raspberry Pi and the servo motors moves and the fruit will be in the corresponding bin. Similarly for unripen also we will have another bin then it will be moved to that bin. All these are displayed in the LCD. Hence the Fruits are sorted out automatically basing upon their colour characteristics.

Block diagram description

A. Raspberry pi:

If we want to define raspberry pi in a single line we can say that it is a credit card size computer. It is able to do all the things which we can do with our CPU. In this project we are using raspberry pi as a controller. The chipset we are using in raspberry pi is BROADCOM BCM 2837 ARM V7 64 BIT QUAD CORE PROCESSOR. It has the processing speed of 1.28 GHZ. It is a 64 bit processor which is able to handle 64 bit of instruction in one clock cycle. Raspberry pi has 1 GB of SDRAM which stand for synchronous dynamic random access memory.

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* Correspondence Author

S.Chitra, Pursing M.Tech, Embedded System, Kuppam Engineering College, Kuppam, Chennai, India.

Mr.T.Siva Kumar, Assistant Professor, Department of ECE, Kuppam Engineering College, Kuppam, Chennai, India.

Dr. S. Nanda Kishore, Associate Professor, Department of ECE, Kuppam Engineering College, Kuppam, Chennai, India.

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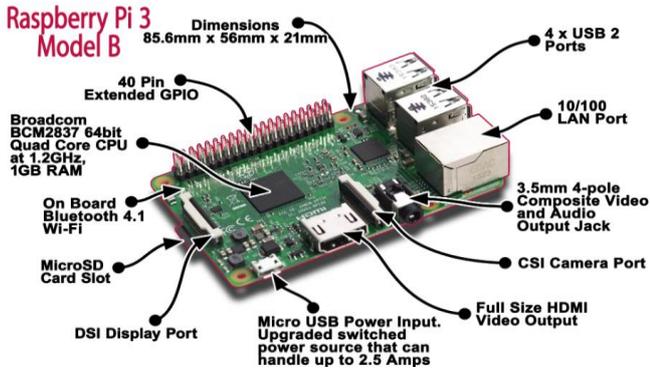


Fig2: Raspberry Pi

Specification

1. Broadcom BCM 2837 controller
2. 64bit ARM V7 quad core processor
3. 1GB of SDRAM
4. 40 input and output pins
5. 4 USB ports
6. LAN port
7. 1.28 GHz process

B. Colour sensor

IN this project we are using colour sensor to identify the mature fruit. Here we have assumption that every mature fruit would be of some different colour than the raw fruit. In this project we are using TCS 3200 sensor for selecting the mature fruit. This sensor has four LED's which will emit the white light on the object then the main sensor will catch the reflected light and analyze the colour of the object.



Fig3: Colour Sensor

C. Servo motor:

A Servo Motor is an electronic device which rotates an object with high accuracy. If we want to rotate an object then we will make use of servo motors. This is just made up of a simple motor which works on the principle of Servo Mechanism. If motor worked with DC power supply then it is DC servo motor and if it works with AC supply then it is AC servo motor.



Fig4: Servo Motors

D. Relay:

Relay is electromagnetic switch that open or close the switches electrically or electromechanically. Relay is mostly used to switch smaller circuits.



Fig5: Relay

E. LCD:

LCD is Liquid Crystal Display is an electronic device which displays alphanumeric characters on screen. 16x2 is the most common LCD used everywhere. These are more preferred than 7 segment display because LCD's are economical, can be programmed easily. LCD's are of different types like 8x1, 8x2, 10x2, 16x1, etc. 16x2 LCD has 16 pins among them 8 pins are data pins through which we send data bit by bit.



Fig6: LCD

F. Buzzer:

A Buzzer is an audio signaling device, which may be used in Automobiles, Household Appliances like Microwave Ovens. Buzzer produces noisy sound based on the voltage applied for it. Most of the buzzers produce sound in the range of 2 to 4 kHz. Buzzers are also called as beepers. There are 2 wires red and black colour. Red lead is to be connected as input and black to Ground



Fig7: Buzzer

IV. ADVANTAGES

1. Fast and Accurate
2. Good repeatability
3. Reduce labor cost and
4. Less human interference

V. APPLICATIONS

1. In food industry to identify rotted fruits and vegetables, in minor scale and big scale productions, to categorize the products established on the several factors.
2. In production units to scan and identify the defects in raw materials.
3. In fruits and vegetable farming areas (rural areas) where installation of expensive sorters is very difficult.
4. In malls (to segregate and separate different clothes, toys, bags etc.) and in small shop.

VI. RESULTS

Maturity of fruit as been identify by using colour sensor based on the colour we will identify the fruit is matured or not. If the fruit is in red colour then it is ripe fruit and the signal is processed to the Raspberry Pi and the servo motors moves and the fruit will be in the corresponding bin. Similarly for unripen also we will have another bin then it will be moved to that bin. And if any another fruit is putted in the sort that time the buzzer will be on. All these are displayed in the LCD. The below figure shows the maturity of fruit identifier

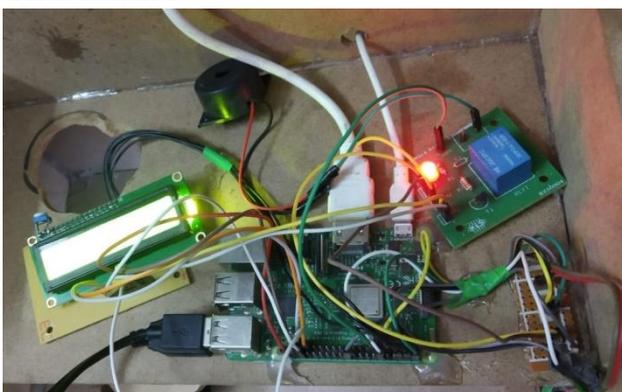


Fig8: The maturity of fruit identifier

Table 1: The result of the separation fruits

| NO OF TEST | MATURED FRUITS | NON-MATURED FRUITS | OTHERS |
|------------|----------------|--------------------|--------|
| Test 1 | 08 | 02 | 00 |
| Test 2 | 03 | 07 | 00 |
| Test 3 | 00 | 00 | 10 |

The above table shows the result of the separation fruits. Here we are taking 10 fruits in a sort and tested by 3 times. In Test 1 ,the fruits are sorted one by one ,based on the color the color sensor will identify 8 matured fruits ,2 non matured fruits and others will be 0.And this data is processed to the raspberry pi and the servo motors moves and the fruit will be in the corresponding bin. Similarly for unripe also we will have another bin then it will be moved to that bin. Similarly the test 2 and test 3 are also tested. And if any another fruit is putted in the sort that time the buzzer will be on. All these are displayed in the LCD.

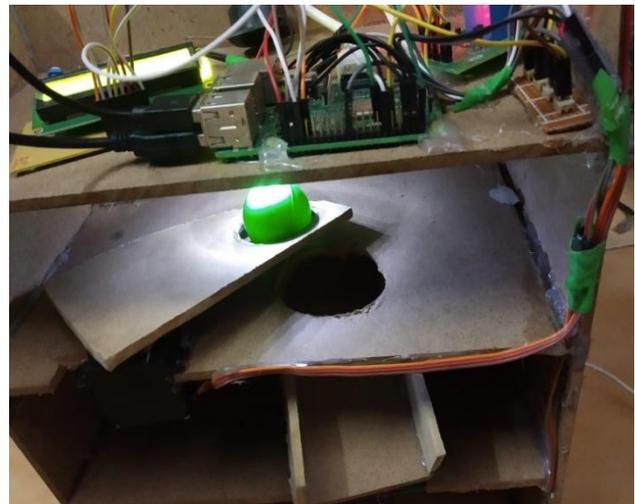


Fig9: separation of ripe and unripe fruits

VII. CONCLUSION

This Paper will be a demo execution which gives expense effective, taking less time and technically the easiest way for differentiating objects. This project utilizes raspberry pi which makes this model simple to utilize which is more additional effective. The main failure will be caused if the sensing of object according to colour is not done. Therefore, it is very important to have proper and checked sensors. Further, making desirable changes it can be used in small scale and large scale industries as well.

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Dr. S. Nanda Kishore, M.Tech, Ph.D., is working as Associate Professor in department of ECE, Kuppam Engineering College, Kuppam. He is a member in Society of Digital Information and Wireless Communication, International Association of Engineers and The Institute of Engineers and Indian Society for Technical Education. He has organized multiple Entrepreneurship orientation programs and Workshops on Analog Electronics and MATLAB Tools. His areas of interests are Digital Electronics and Communication Systems, Internet of Things and Embedded Systems.

AUTHORS PROFILES



S.Chitra, obtained B.Tech (ECE) from Vemu Institute of Technology, Chittoor and pursuing M.Tech in Embedded system from Kuppam Engineering College, Kuppam. She is Athirst to exploring various technologies like Electronics and Internet of Things. She is participated in Barclays GTT training program in National level and College organized Industrial visits. Her areas

of interests are Internet of Things and Embedded Systems.



Mr.T.Siva Kumar, M.Tech, is working as Assistant Professor in department of ECE, Kuppam Engineering College, Kuppam. He has organized on APSSDC and Workshops on NITTTR and embedded Systems and PIC18452 Microcontroller. He is a member in International Society for Research and Development .His Areas of interests are Linux

Programming, Internet of Things and Embedded Systems