

Rgb Hexacode Based Lemon Segregation and Weight Detection System

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Abstract: In large agriculture sectors collection and segregation of different products and similar products are done by humans, which requires lot of time and more number of labors, Which would result in high capital investment and not reliable. During harvesting the lemons may be ripe, not ripped and some even spoilt, before transportation the farmer needs to have a check on the status, quantity and weight of these lemons. This gives an idea to computerize the entire process by the use of color sensor. Depending on the color of the fruit, we get the RGB values which helps us to differentiate between themselves. Improving post agricultural process efficiency can contribute greatly to reducing post production costs of lemons, making the industry more competitive and sustainable. The objective is to lessen the human effort in every way possible thereby saving time, making the process error free and make agriculture an economical process.

Keywords: RGB, ARDUINO, LCD, BO motor

I. INTRODUCTION

The distinguishing feature of rural economy of India has been the growth of agriculture labor in the crop production. The phenomena of under-employment, under-development and surplus population are visible amongst agricultural laborers. Agricultural labors constitute the most neglected class in Indian rural sector and are highly unorganized. The income level of these workers is quite low and employment is quite irregular. Further, these workers lack alternative employment due to lack of training and skills [1]. Agriculture is the broadest economic sector and plays an important role in the overall economic development of a nation. Technological advancements in the arena of agriculture will ascertain to increase the competence of certain farming activities [2]. Issues concerning agriculture have been always hindering the development of the country. The only solution to this problem is smart agriculture by modernizing the current traditional methods of agriculture. Unfortunately, many farmers still use the traditional methods of farming which results in low yielding of crops and fruits. But wherever automation had been implemented and human beings had been replaced by automatic machineries, the yield has been improved. Hence there is need to implement modern science and technology in the agriculture sector for increasing the yield. Most of the papers signifies the use of wireless sensor network which collects the data from different types of sensors and then send it to main server using wireless protocol. The collected data provides the information about different environmental factors which in turns helps to monitor the system [3].

Automation is the use of machines, control systems and information technologies to optimize productivity in the production of goods and delivery of services. Automation is the answer to India's pursuit for being a world-class industrial competitor. The Indian farms are slowly beginning to feel the stimulus for the instrumentation, control and automation industry. Indian automation is advancing at a fast pace, yet it is one area that can never be achieved and admired – it is something that needs constant innovation and identification of trends in technology, and the innovations that thrust the implementation of automation in other countries. India, as one of the world's fastest growing economies based on agriculture and farming, has not taken to technology at a rather quick pace [4].

In this work mainly the following features are designed

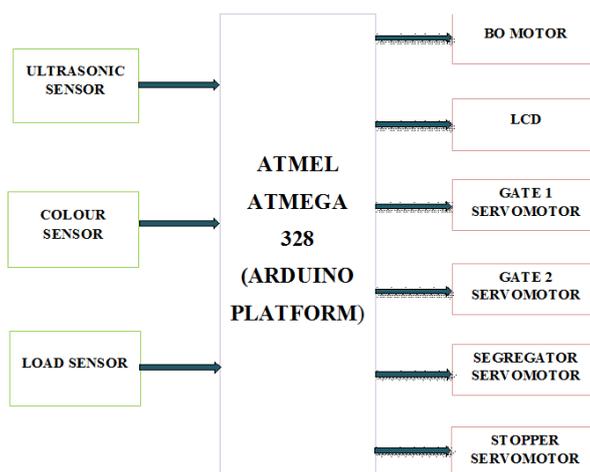
- (i) Design and implementation of collector capable of holding number of lemons.
- (ii) Design of dropping mechanism for dropping lemons one by one for further processing.
- (iii) Design and programming of color sensor to identify different state of lemons.
- (iv) Design of weight sensor capable of weighing different state of lemons separately.
- (v) Design and development of segregator which drops lemons in separately identified bowls.
- (vi) Design and implementation of an LCD display system to display various data (number of lemons, weight, and number of ripened, unripen and spoiled lemons).

II. LEMON SEGREGATOR SYSTEM

1. Introduction

In large agriculture sectors collection and segregation of different products and similar products are done by humans, which requires lot of time and more number of labors, Which would result in high capital investment and not reliable. This gives an idea to computerize the entire process by the use of color sensor. Depending on the color of the fruit, we get the RGB values which helps us to differentiate between themselves. The RGB color model is an additive color model in which Red, Green, Blue lights are added together in various ways to reproduce a broad array of colors. The name of the model comes from the initials of the three additive primary colors i.e., Red, Green, Blue. This is the main process involved in this project. Lemon may be ripen, unripen or spoiled, this can be differentiated by their color i.e., Yellow, Green, brown respectively, by using the color sensor various values of red, green, blue for given sample are obtained and the combination of these values result in some definite color. Microcontroller compares with the defined values and segregates accordingly. Its application is found in automatic segregation of agricultural commodities based on RGB values and weighing the same. This method is time efficient, economical, requires less number of labors. Though being efficient it lacks in its accuracy to differentiate between colors. Thus to overcome this we can either use more than one color sensor or with help of image processing by using a camera.

2. Block Diagram

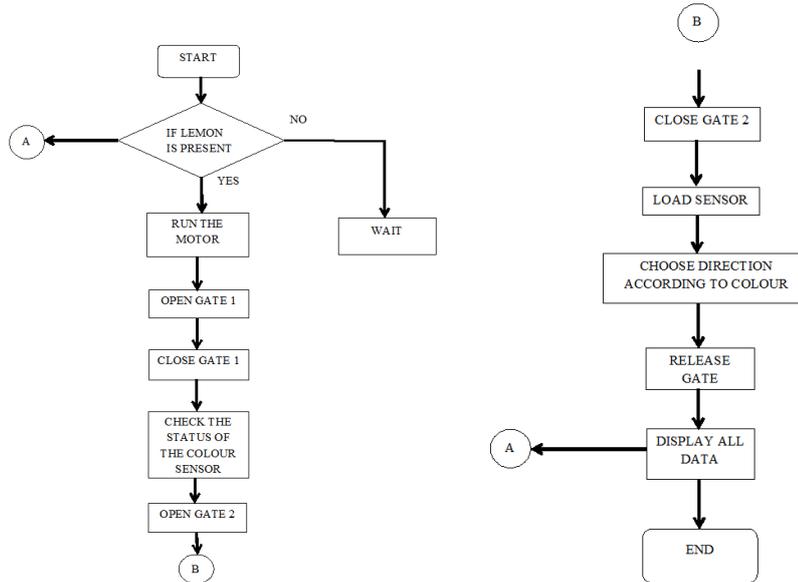


3. Operation

Ultrasonic sensor senses the presence of lemon or absence in the funnel. The main principle this sensor uses is “echo”. It has a transmitter and receiver which sends a signal to a certain distance and receives the signal that has reflected from any of the objects and sends the signal to Arduino. Arduino sends a signal for either running the BO motors or to display in LCD depending on the presence or absence of lemons. Color sensor detects the color of the lemon based on their RGB values. The values obtained are in hexa and these values are fed to the Arduino board and the lemons are segregated according to the RGB range set for the type of lemon. Load sensor detects the weight of each lemon and send the values to the Arduino board. The Arduino then displays these values on the LCD. BO motor or Battery operated motor its mainly used for steering the lemons so that lemons fall into the path one by one. This is done after the ultrasonic sensor sends the signal to the Arduino board. A liquid crystal display is a flat panel display or electronic visual display. It displays the results such as ripen, unripen and spoiled. It also displays the weight and number of lemons. This displays only after all the lemons have been segregated. Servo motor allows for precise control of angular and linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.

III. ALGORITHM AND FLOW CHART

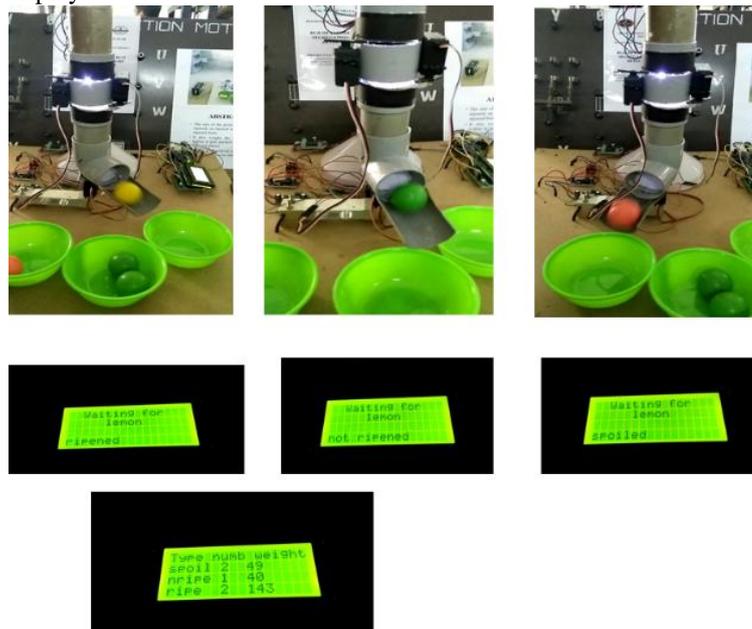
Flow Chart



The first step involves the detection of lemon whether it is present or not using ultrasonic sensor. If the lemon is present gate 1 servomotor opens. Once the gate 1 servomotor opens colour sensor detects the colour of the lemon based on RGB values. Then gate 2 servomotor opens. After the colour detection gate 2 servomotor closes and load sensor detects the weight and send the signal to the Arduino. Once the Arduino receives the signal by releasing the gate the lemon fall into the respective bowls. Then all the data is displayed using the display i.e. LCD.

IV. FIGURES AND TABLES

Figure shown below shows the various sequence of events happening in the lemon segregation process. In clockwise rotation if we look into the images, the very first image talks about separation of ripe lemon, second image shows the segregation of unripe lemon, third image classifies bad or spoilt lemon. During the segregation process, the built in weight detection system constantly weighs the lemon weight and displays it on Liquid crystal display.



V. RESULTS

The lemon segregation system segregates lemon based on color. Also each lemon weight is displayed on LCD. This is done by capturing the RGB values of each lemon using a colour sensor. This system also displays the final data about the weight and also the number.

VI. CONCLUSION

This project gives an idea of the fruit segregation. The major problem in the agriculture field is the labor problem and availability of skilled labors. This project is the solution for the above problems. The same project can be implemented for other kinds of fruits also. This project will give an idea of interfacing of the sensors with the Arduino as the input devices & various motors as the outputs.

In the present scenario customers are cheated by the shopkeepers in many ways. One such example is about the Washington apple, wherein the customers cannot differentiate between normal apple and Washington apple. Thus shopkeepers fool the people by selling the normal apple claiming it to be Washington apple. Here this scenario can be avoided by coding the color sensor for these apples so that the apples can be differentiated. With this customer can avoid getting cheated.

VII. Acknowledgements

We are thankful and express our heart-full gratitude to the magnanimous management of BMS Institute of Technology and Management, for providing an opportunity of fulfilling our most cherished desire of reaching our goals and thus helping to pave a bright career for us. We would like to specially express our sincere gratitude to our respected principal Dr. Mohan Babu GN for providing everlasting support.

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