

Color Sorting Based on Internet of Things

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Abstract— Sorting of products is a very difficult industrial process. Continuous manual sorting creates consistency issues. This paper describes a working prototype designed for automatic sorting of objects based on the color. TCS230 sensor was used to detect the color of the product and the Arduino microcontroller was used to control the overall process. The identification of the color is based on the frequency analysis of the output of TCS230 sensor. Two conveyor belts were used, each controlled by separate DC motors. The first belt is for placing the product to be analyzed by the color sensor, and the second belt is for moving the container, having separated compartments, in order to separate the products. The experimental results promise that the prototype will fulfill the needs for higher production and precise quality in the field of automation.

Keywords—TCS230, Color Sensor, Color Sorting, DC motor

I. INTRODUCTION

The color sorting machine using Aurdino is a fascinating and renowned project for techies, who would like to combine Electronics, Machine Building and Programming. The Color Sorting Machines is used for sorting mainly RGB colors. This color sorting machine separates different colored objects and classifies them in to respective containers. The color sorting machine is fully automated with the help of Aurdino. The main purpose of the color sorting is used on production lines in bulk food processing and other industries. The color sorter separates the items by their colors. The color sorter is mostly used for color sorting in different industries such as grain industry, food industry, demand and mining industry [1].

II. LITERATURE SURVEY

In recent year, there are many implementation is going on for the industries for food packing.

Many researchers are implementing to optimize efficiency of the Color sorting machine. Practically we can implement the in the industries to optimize the better result and to improve the technology and provide less effort human [3].

III. MATERIALS AND METHODOLOGY

The proposed system is designed for automatic sorting of Red or Green or Black colored products. The prototype consists of two DC motors, two conveyor belt, a PIC and a

color sensing circuit using TCS230 . DC motors are used to control the conveyor belts. After integrating the programmed PIC and the TCS230 circuitry with the structure of the model, we measure the frequency of signals corresponding to each color by observing them on a CRO[4][8]. Based on this study the timer delay value is adjusted by reprogramming the Arduino. The time required for the product to reach the corresponding container in the separator placed on second conveyor belt is also considered. L293D Hybrid IC is used to drive the second motor both in clock wise and anti-clock wise direction, which provides the to and fro movement of the container of dimensions 9cm x 30cm x 7cm (Width x Length x Height)[5][7]. Separators were used to create compartments of equal sizes meant for collecting objects of same color. The end section consist of a DC motor (5.5V, 30rpm), which is used to control the movement of the second conveyor belt in order to position the separator according to the sensor output[6].

IV. HARDWARE IMPLEMENTATION AND WORKING

We prepared a Color Sorting Machine using Aurdino and different hardware component like The hardware implementation of this project needs following component - Arduino, Color Sensor, Servo Motor, Bread Board, Jumper Wires[2].

The Hardware implementation of proposed project work is shown in figure 1.

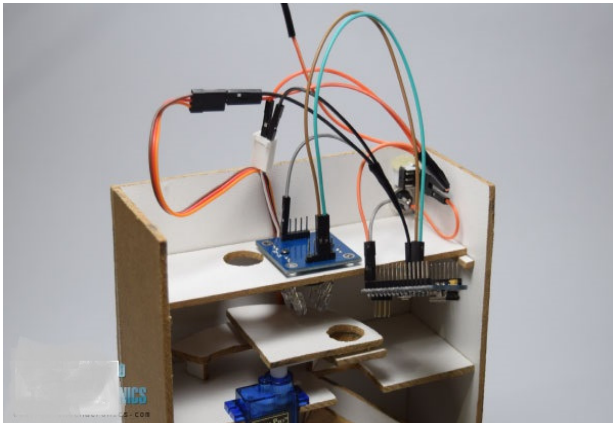


Figure 1. Hardware Implementation of model project

V. WORKING OF MODEL PROJECT

Step 1: Initially, the colored skittles which are held in the charger drop into the plat attached on the top servo motor.

Step 2: Then the servo motor rotates and brings the skittle to the color sensor which detects its color.

Step 3: After that the bottom servo motor rotates to the particular position and then the top servo motor rotates again till the skittle drop into the guide rail.

VI. RESULTS AND DISCUSSION

We have developed a sorting machine using Aurdino for automatic color sorting, taking in to consideration three colors namely Green, Red and Black. The identification of the color is based on the frequency analysis of the output of TCS230 sensor. We consumed two months to produce the prototype with the expense of Rs.2000.shows different stages involved in the process. We have note that the green object and the red object lying in different sections of the container placed on the second conveyor belt. The color sorting result fulfil the needs for higher production and precise quality in the field of automation.

VII. CONCLUSION AND FUTURE SCOPE

It is very useful in wide varieties of industries along with the help of PLC and SCADA, especially in the packaging section. Automatic sorting machine enhances efficiency, practicality, and safety of operators. It ensures remarkable processing capacity as well as peerless performance including color detection. Of course we need to add high speed DC motors and sensors with appreciable response to speed up the system for industrial application. The model can be improved by making some changes in the program and components. Some suggestions are given below.

- We can add a load cell for measurement and control of weight of the product
- We can also add a counter for counting the number of products
 - The speed of the system can be increased accounting to the speed of production
 - The system can be used as a quality controller by adding more sensors
- The sensor can be changed according to the type of product
- The DC motor can be replaced with stepper motor
- The PIC can be replaced with PLC

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