Smart Color Sorting Machine using TCS3200

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ABSTRACT

Sorting of different types objects is an essential in any process in which difficult work is found. We Found Chronic manual arranging makes persist and consist troubles. All Machines can perform mainly dreary different assignments best to living human being. Labors exhaustion on repetitive manufacturing product designs can result in reduced execution, and purpose troubles in retaining up to the object good state. An Different employees who has been appearing research & Development undertaking over and may additional in the end forgot about to recognizing the colors of item, but this machine in no way. On this paper a arrange the records close to arranging of articles-based total on shading has been implement by making use of the shading sensor TCS3200 with two servo motors associated with the AURDINO UNO Development board. Continuous manual sorting creates repetitive problems created. In This research paper describes a real-time practical working of prototype designed for fully automatic sorting of objects automate based on the colors sense TCS3200 sensor was used to detect the different colors frequency of the product and the ArduinoUNO board was used to operate the all the work-process. The identification of the colors is based on output of TCS3200 sensor on the frequency analysis . its use Two normal servo motors were used here. The first motor is for operate the product to be analysis by the color sensor, and the second motor use for rotate moving the side arm to the container for separated compartments in order to separation of various products. The project gives faithfully results that the prototype project will fulfill the requirements for bulk production and precisely quality in the work field of any proccess industries.

Keywords : TCS3200 color sensor, Arduino uno, conveyer belt, Servo motor

I. INTRODUCTION

Sorting of objects is everywhere used in many industries like toy industries, food processing industries etc. to must ensure that the better quality of the product is up to the mark. This process is effective by the use of automation. Labors exhaustion on repetitive manufacturing product designs can result in reduced execution, and purpose troubles in retaining up to the object good state. An Different

employees who has been appearing research & Development undertaking over and may additional in the end forgot about to recognizing the colors of item, but this machine in no way. The system being developed is to identify the object on the conveyor belt with the help of a TCS230 colour sensor and sort the object based on their colour frequency. The system should be identify the objects and then sorting the objects on colour their properties. Objects may have different colors ,Sizes, shapes. Our aim is to separation objects using this system project.
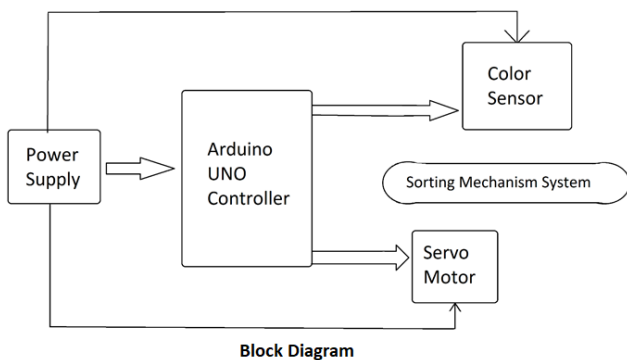
II. PROPOSED SYSTEM

Fig1: Color sorting machine

System Description

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/cups.

The Color Sorting machine is fully automated with the help of Arduino UNO. This Electronics Project made up of Arduino UNO along with Arduino UNO BOB, RGB Color Sensor, Two Servo Motors and some plastic funnels and tube parts.

Since the servo motor is used, so the servo library is essential part of the program. Here we are using two servo motors. The first servo will move the colored balls from initial position to TCS3200 detector

position and then move to the sorting position where the ball will be dropped. After moving to sorting position, the second servo will drop the ball using its arm to the desired color bucket.

III. HARDWARE REQUIREMENT

1. Arduino uno
2. Power Supply
3. TCS color sensor
4. ConnectingWires
5. Servo Motor

3.1) Arduino Uno

Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

Fig 2 : Arduino

Specifications:-

✓ Microcontroller: MicrochipATmega328P[7]
✓ Operating Voltage: 5Volts
✓ Input Voltage: 7 to 20Volts

- ✓ Digital I/O Pins: 14 (of which 6 can provide PWM output)
- ✓ UART:1, I2C:1 ,SPPI:1
- ✓ Analog Input Pins:6
- ✓ DC Current per I/O Pin: 20 mA
- ✓ DC Current for 3.3V Pin: 50mA
- ✓ Flash Memory: 32 KB of which 0.5 KB used by boot loader
- ✓ SRAM: 2 KB EEPROM: 1 KB
- ✓ Clock Speed: 16MHz

3.2)TCS3200 color sensor

The Color Sensor is a complete color detector. We can use TCS3200 colored sensor chip. It can detect and measure a nearly limitless range of visible colors to a certain degree.

Fig 3 : TCS3200 Color Sensor

The color sensor is embedded inside the color sorting section. Color sensor analyzes and classifies the RGB colors and provides the corresponding output values for the RGB colors to the Arduino UNO.TCS 3200 Color Sensor is used with this Color Sorting machine. This sensor acts as a perfect color sensor for the Color Sorting Machine. The

TCS3200 Color sensor's PCB module includes a TAOS TCS3200 RGB color sensor chip, white LEDs (4 Numbers) and LED control circuit with some basic components.

3.3) Servo motor:

Fig 4 : Servo Motor

The colored skittles which are held in the charger drop into the platform attached on the top servo motor. Then the servo motor rotates and brings the skittle to the color sensor which detects its color.
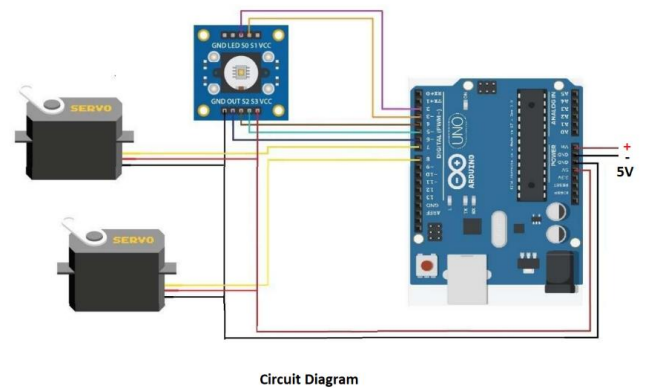
IV. CIRCUIT DIAGRAM

Fig 5: Circuit Diagram

TCS3200 Color Sensor is used with this color sorting machine. This sensor acts as a perfect color sensor for the color sorting Machine. The TCS3200 Color sensor's PCB module includes a TAOS TCS3200RGB color sensor chip, white LEDs (4 Numbers) and LED control circuit with some basic components.

Features of TCS3200 Color Sensor are a programmable high resolution color light to frequency converter sensor. It provides a programmable color and full scale output frequency and can directly control with the Microcontroller.

In this color sorter, it is essential need to know about Infrared Object Detection Sensor. This Medium Range Infrared sensor offers simple, user friendly and fast obstacle detection using infrared; it is non-contact detection.

The implementations of modulated IR signal immune the sensor to the interferences caused by the normal light of a light bulb or the sun light. The sensing distance can be adjusted manually.

V. PROGRAMMING

There are two Arduino programs for color sorter that there are color math program and color sorter program.

1) Color Math

The color sorter machine needs to specify default color value for current location and light condition. If you not specify value, the machine can't classify the color. The Color Match program is used for default color recording the object and records the color under the two conditions LED ON and OFF.

2) Color Sorter

This program is written by Arduino programming language. This program is main control program for color sorter machine. The recorded values form the color math program is filled to the color sorter program. The program has three parts; they are define the pins, initiation the pin such as input or output and looping the program.

5.1) Flow chart:

The flow chart is easy way to understand the programming language and compose by sample blocks and round rectangle.
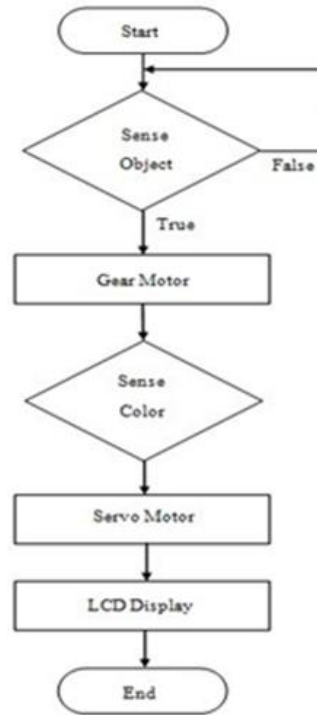

Fig 5: Flow chart

VI. RESULT AND ANALYSIS

Fig 6 : Simulation Project

VII. FUTURE SCOPE

1. We can sense large numbers of color by color sensor and sorted more objects using extra hardware and software assembly.
2. We can use a Robotic arm to pick and place the object.
3. By using counter we can count the number of objects.
4. Speed of the system can be increased accounting to the speed of production
5. The system can be used as a quality controller
6. by adding more sensors

VIII. CONCLUSION

The fully automatic system outlined above provides cost effective, low time consuming and technically simple approach for sorting of objects. This system uses C programming which makes the model easy to use and more efficient. Generally, sensing the color of the object is a big challenge as there is a chance of high uncertainty due to the external lighting conditions.

Similarly while collecting the objects from conveyor by using a linear actuator system. This project of automatic color sorting is excellent one because of its working principle and wide implementation.

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