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# Automation of colour Object Shorting Based on Conveyor Belt

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**Abstract-***Sorting is a process in which two or more objects of similar, yet different characteristics are arranged in a systematic order. This is generally carry through manually or by using sensors in automation. Here a highly automated system is proposed which uses Arduino UNO for detecting the presence of objects and their color and allows only those objects which are of desired color to pass through conveyor belt and deselect those colored objects which are unpleasant away from the belt. A linear actuator is activated by passing a high signal when the color is undesirable which push off the objects to deselect them. This is carried out using 'C' code which Arduino UNO supports.*

## 1. INTRODUCTION

Sorting of objects is everywhere used in many industries like food processing industries, toy industries, etc. to ensure that the quality of the product is up to the mark. This process is simplify by the use of automation. Automation is the use of restraint systems like computers or robots for handling different process and machineries to replace a human being and provides mechanical assistance. This not only reduces manual efforts, time consumed, gives more time for marketing, but also prevents danger which might occur when human beings work in hazardous environments. In manufacturing industries, there produce a need to sort objects. The objects may be of similar or dissimilar types. The system should be detect the objects and then sorting the objects on their properties. Objects may have different colors. The objects may be of different shape and different colors. Our aim is to classify objects using different Color.

## 2. EXISTING SYSTEM

In the existing system the objects are sorted manually mostly by human beings.

- This creates a tendency for human errors to come into account and thus result in the work going wrong.
- If objects or parts in industries are not sorted correctly then there is a high chance of huge chaos and the final product being defective.

## 3. TECHNICAL OVERVIEW

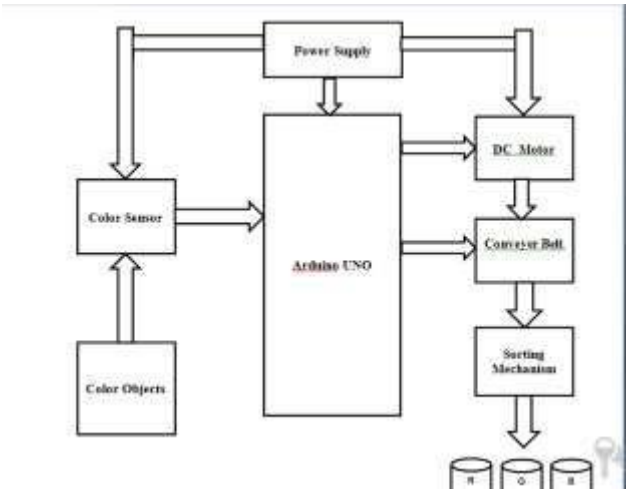


**Fig 1-** Diagrammatic representation

### 3.1 Working

The aim of this project is to understand the Arduino UNO Color Sensor Interface and how can we make a Color Detection application using Arduino UNO and TCS3200 Color Sensor.

For the given block diagram the objects are sorted based on the color. To detect the color of the object, the color detection circuit along with color sensor is used.. The Arduino UNO will be used as controlling device to carry out various activities by taking proper decisions.

As we are sorting the object we will need mechanical mechanism to sort the object using a Servo motor and Conveyer Belt.. First the object will be sorted based on its color with help of color sensor. The color sensor that will used in this project is TCS3200. It detects the color of object and gives specific no of code to the Arduino UNO. The Arduino UNO compares the code with the stored data and gives specified output related to the input.. Finally the controller will give command to mechanical assembly to place the object at specified location.

Objects which are to be placed on the Conveyer Belt. Those objects which are of desired color will be allowed to pass through the Conveyer Belt and are put into the trolley at the receiving end for packing.

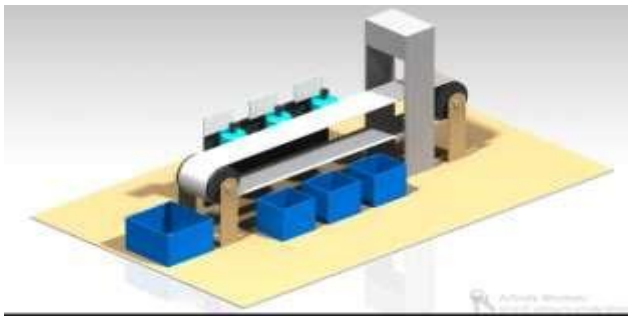

**Fig.2-.**Design in CAD Model

## 4.DESIGN OF THE SYSTEM

**4.1 Arduino :** An Arduino board consists of an Atmel 8-bit AVR microcontroller with integral segments that stimulate programming and joining into different circuits. In an Ardiuno the critical parts are in standard connectors, which gives a opportunity to connect the CPU board to an assortment of compatible extra modules known as shields. Official Arduino uses the mega AVR arrangement of chips, particularly the ATmega8, A Tmega168, ATmega328, ATmega1280, andATmega2560. Arduino is an uncomplicated to use hardware and software which is build on open source electronic platform. Arduino boards are functional for publishing something online, turning on LED, a figure on button, read input-light on a sensor. You can tell your board what to do by sending a set of directive to the microcontroller on the board. To do that things so you can use the Arduino programming language and the Arduino Software (IDE), based on Processing.

**4.2 Colour Sensor:** The Colour Sensor is a complete colour detector. We can use TCS3200 colored sensor chip. It can detect and measure a nearly limitless range of visible colours to a certain degree.

**4.3 Dc Motor:** A DC motor is any of a class of rotary electrical instument that converts direct current electrical power into mechanical power. The most common types depend on the forces produced by magnetic fields. The internal mechanism of all types of DC motors, either electronic or electromechanical, to periodically change the path of current flow in the part of motor.

**4.4 Conveyor Belt:** Conveyor belts work by using two pulleys that continually loop over the material that rotates over them. This is done with unlimited procession of hooks, gears and a wide rubber belt. The rollers can support the

belt along the path. In this project conveyer belt is used to transfer the Object one end to another end in the sorting mechanism. For sorting effectively.

**4.5 Software (Arduino is programmed with C and C++):** C++ can be considered as a superset of C. Basically, C++ can be defined as C with object-oriented implementation which is a higher-level feature. This is a very nice feature that brings and provides new ways of design. We'll enter together into this concept a bit later in this book but basically, in object- oriented programs, you define structures called classes that are a kind of a model, and you create objects called instances of those classes, which have their own life at runtime and which respect and inherit the structure of the class from which they came. Object-oriented programming (OOP) provides properties that are very useful and interesting:

- Data encapsulation (each instance retains its data and functions)
- Object identity (each instance is an individual)
- Polymorphism (each behavior can depend on the context)

In OOP, we define classes first and then we use specific functions called constructors to create instances of those classes. Imagine that a class is a map of a type of house, and the instances are all the houses built according to the map.

Almost all Arduino libraries are made using C++ in order to be easily reusable, which is one of the most important qualities in programming

**5. THE FEASIBILITY STUDY CAN BE CATEGORIZED INTO:**

1) Technical Feasibility: It has been determined that the technology required for the planned system is accessible which this technology may be integrated into the appliance**.**

2) Operational Feasibility: There are two aspects of operational feasibility for the system. One aspect is that of technical performance and other is of acceptance.

3) Economic Feasibility: The economic practicableness of the system is principally involved with its money aspects. It determines whether or not the project is economically possible.

**6. HARDWARE AND SOFTWARE REQUIREMENT**

A. Hardware Requirement

1.Arduino Uno 2. Conveyer belt

3.Power supply 4.TCS230 colour sensor

5.Dc motor 6.Servo motor

B. Software Requirement: 1'C'Programming

**7. RESULT**

The paper presents design, development of the sorting object. Using microcontroller Arduino UN0 the objects are sorted as per the color. The color detection is identified by the color sensor. The sensed signal is sent to a microcontroller unit and sent to 16x2 LCD display for displaying the color of the sensed object. Here IR sensor is used for counting the number of objects which are moved on the conveyor belt that count value is also displayed on the LCD.

In this, objects of 3 colors red, blue and green are chosen for demonstration purpose. The system output is displayed on the LCD display i.e name of the project - automatic

color sorting, color of the object- red or blue or green and final count of the objects – item number which are sorted.


Figure 3: LCD Display

Above figure shows final result displayed on the LCD display of count value of the objects which are passed on the conveyor belt.

**7. 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.

The objects are sorted out based upon the color sensor. We have used a Linux based board called raspberry pi, interfaced with USB camera and color sensor to sense color of the object and camera capture the images of the objects and store them. The stored images will be processed for calculating shape of object by using C code Software.

As we know the sorting system is very useful for the production area and it gives a proper and clear sorting of the object.

**8. 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 by adding more sensors

**9. APPLICATIONS:-**

1. Food Industries
2. Agricultural Product Sorting
3. Airport
4. Toy Industry
5. Pharmaceutical
6. Industrial Automation

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