

Product based Color Sorting Machine using Arduino

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Abstract: *Sorting of objects is an essential mechanical process in which difficult work is quite required. Chronic manual arranging makes consistency troubles. In this digital world, colour processing in different industries gives us more leverage to solve the consistency problem of continuous manual sorting. This project introduces a sophisticated colour sorting system, named the "Product-Based Colour Sorting Machine," designed to efficiently categories objects based on their colours. Leveraging the power of Arduino technology and precision control through servo motors, our system offers a reliable and cost-effective solution for diverse applications. Our project presents an Arduino-based colour sorting machine that efficiently categorizes objects by their colours. Utilizing IR sensor for reliable object detection, ensuring robust sorting accuracy across varying environmental conditions and advanced colour sensor technology and precise servo motor control, this system ensures efficient and accurate categorization of objects by their colours. With SG90 Servo motors managing both channel guide rotation and object halting, the machine eliminates the challenges of manual sorting, offering a reliable, cost-effective, and highly adaptable solution for industries.*

Keywords: Color sorting, Conveyor belt, DC motor, PIC 16F628A, TCS230 color sensor.

I. INTRODUCTION

The colour sorting machines is used for sorting mainly RGB colours. This paper describes a working prototype designed for automatic sorting of objects based on the colour. The colour sorting machine using Arduino uno is a fascinating and renowned project for techniques, which would like to combine electronics, machine building and programming. The colour sorting machine is fully automated with the help of Arduino uno. Block diagram of system is as shown in Fig 1

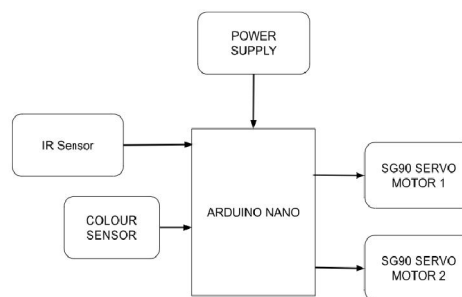


Fig 1. Block Diagram

In this Block Diagram, the Arduino Nano is used as a microcontroller. The Colour Sensor and IR Sensor is used as an input device which is connected to the Arduino Nano and the Two SG90 servo motors are attached to the Arduino Nano as an output device. As industries increasingly demand automated processes, our system's modular design not only meets these evolving needs but also presents a cost-effective and user-friendly approach. The modular design of the system allows for easy integration into existing processes, enhancing overall efficiency and reducing manual labour.

This sophisticated system is designed to revolutionise the sorting process by employing the agility of SG90 Servo motors to rotate the channel guide and act as a gate, effectively controlling the flow of colour-coded objects. IR sensor enhances the system's reliability in detecting objects, the integration of a highly sensitive colour sensor adds a layer of intelligence, enabling the machine to discern and categorise products based on their distinct colours. As we delve into the intricacies of this Arduino-powered marvel, we unveil a new era of efficiency and accuracy in product sorting applications.

II. OBJECTIVES

- To streamline operations, reduce labors costs, and enhance efficiency through automated colour sorting.
- To minimize errors and improve accuracy in sorting tasks across industries.
- To offer a versatile, user-friendly solution adaptable to diverse manufacturing, recycling, and quality control processes.
- To provide a cost-effective and scalable remedy for the longstanding challenges associated with manual colour sorting.

III. CIRCUIT DIAGRAM

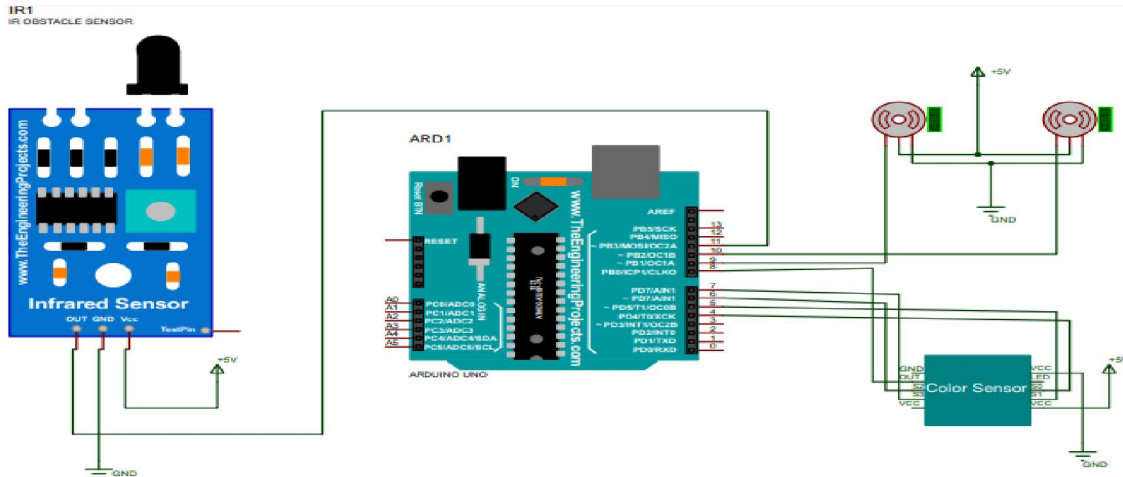


Fig.2. Circuit Diagram

IV. WORKING

The process begins with the IR sensor detecting the presence of an object passing through its detection zone. Once an object is detected, the system activates the SG90 Servo motors to facilitate the smooth flow of the product along the channel guide. The colour sensor analyzes the unique colour signature of the passing object. Based on the colour detected, the Arduino controller triggers the appropriate servo motor to redirect the object to its designated sorting channel. This precise sorting mechanism ensures accurate categorization of objects, optimizing operational efficiency. Additionally, the inclusion of the IR sensor enhances the system's reliability in object detection, ensuring consistent performance even in challenging environmental conditions. The system streamlines the sorting process, offering a versatile and efficient solution for various sorting applications.

V. SYSTEM REQUIREMENT

HARDWARE REQUIREMENT

- Arduino Nano
- 2 SG90 Servo motor
- Colour Sensor
- IR Sensor

SOFTWARE REQUIREMENT

- Arduino IDE
- Proteus

VI. RESULT

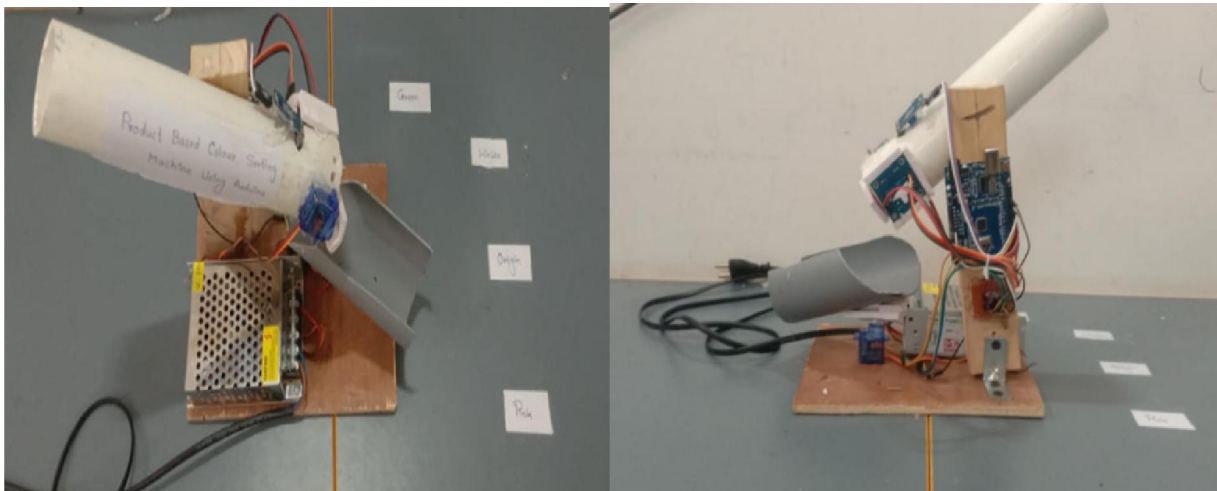


Fig.3

VII. CONCLUSION

In conclusion suggested framework will be a demo rendition which gives expense effective, taking less time and technically the easiest way for differentiating objects. This framework utilizes Arduino Uno 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 color 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.

Here we developed a prototype which automatically sort out color discs in the respectiveColor pots with the help of a micro-controller. It will help in reducing human effort anderror. Our circuit consists of ESP32, TSC230, Stepper motor with driver and servo motor.First after switching on, the stepper motor places the color disc above the TSC230 colorsensor. After sensing the color of the disc, the servo motor place, the color discs to therespective color pots with the help of a sliding platform. All the motors are controlled by the microcontroller.

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