**Automated Color Sorting System**

**1. Introduction**

The project focuses on designing an automated system that sorts objects based on their colors using a color sensor, servo motors, and a conveyor belt mechanism. The system is controlled by an Arduino microcontroller, which processes data from the sensor and commands the servo motor to direct the object to the appropriate bin. This project simulates a real-world industrial sorting process, commonly used in packaging, recycling, and food processing industries.

**2. Objectives**

* To automate the sorting of objects based on color using a microcontroller-based system.
* To use a conveyor belt system controlled by an L298N motor driver for transporting objects.
* To use servo motors for physically directing objects into separate bins based on color detection.
* To develop a low-cost and scalable color sorting prototype.

**3. Components Used**

| **Component** |
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| Arduino Uno |
| TCS3200 |
| L298N Motor Driver |
| DC Gear Motor |
| Servo Motors |
| Conveyor Belt Mechanism |
| 12V Power Supply |
| Breadboard & Jumper Wires |
| Colored Objects |

**4. System Working Principle**

1. **Object Detection**: A colored object is placed on the moving conveyor belt.
2. **Color Sensing**: When the object passes under the TCS3200 color sensor, it detects the RGB values and determines the color.
3. **Signal Processing**: The Arduino receives the RGB data, processes it, and identifies the object’s color based on threshold values.
4. **Object Sorting**: Based on the identified color, a corresponding servo motor is activated to push or direct the object into the appropriate collection bin.
5. **Repeat Cycle**: The system continues operating for the next object on the conveyor belt.