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COLOR DETECTOR AND SORTING MACHINE

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ABSTRACT:

The Color Detector and Sorting Machine is an automated system designed to identify and classify objects based on their color. It uses an IR sensor for object detection, an ESP32 microcontroller for processing, and servo motors to operate a conveyor belt and sorting mechanism. The system is powered using a DSO (Dual Supply Output), ensuring stable operation. This technology finds applications in industrial automation, recycling, packaging, textile, pharma, and casinos, enhancing efficiency and productivity.

Keywords: Color detection, ESP32, IR sensor, Servo motor, Conveyor belt, Automation, DSO power supply

Introduction:

Automation in industries has led to the development of intelligent sorting systems to improve efficiency and reduce human intervention. Color-based sorting is widely used in manufacturing, food processing, and waste management. This project introduces a cost-effective and efficient color sorting system using ESP32, IR sensors, and servo motors, ensuring real-time sorting with high precision.

Methodology:

1. **System Components: -**

- ESP32: The microcontroller processes data and controls the sorting mechanism.
- IR Sensor: Detects the presence of objects on the conveyor belt.
- Color Sensor (TCS3200 or Similar): Identifies the color of the object.
- Servo Motors: Operate the conveyor belt and sorting mechanism.
- Motor Driver: Controls the servo motors.
- Conveyor Belt: Moves objects towards the sorting mechanism.
- DSO Power Supply: Provides stable power to the system components.

2. **Working Principle:**

The IR sensor detects an incoming object on the conveyor belt. The color sensor captures and identifies the object's color. The ESP32 processes the color data and determines the sorting category. Based on the detected color, the servo motors adjust the conveyor belt direction or activate the sorting arm. The sorted objects are directed into respective bins.

Results :

The system successfully detects colors and sorts objects with high accuracy. Testing showed that:

- The IR sensor detects objects with a response time of less than 1 second.
- The color detection achieves an accuracy of 90% under stable lighting conditions.
- The sorting mechanism operates efficiently, handling 50-100 objects per minute.
- The DSO power supply ensures stable voltage, preventing fluctuations in motor performance.

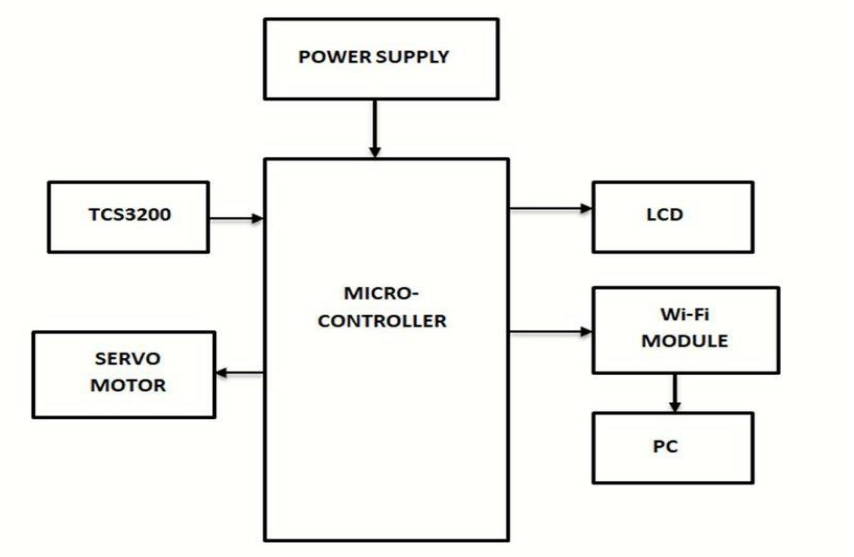

Fig 1 Block Diagram

List all the material used from various sources for making this project proposal

Sr. No.	Component Name	Quantity	Cost
1.	Servo Motor	1	120
2.	Gear Motor	2	450
3.	High Rpm tyre	2	60
4.	Bread Board	1	50
5.	Drill Machine	1	600
6.	Connecting wires	8	150
7.	PVC Sheet (4x4)	1	500
8.	IR Sensor	1	670
9.	Esp-32	1	675

Conclusion :

The proposed Color Detector and Sorting Machine provides an efficient, cost-effective, and automated solution for color-based sorting. It significantly reduces manual effort, increases accuracy, and improves sorting speed. Future enhancements could include AI-based image processing and wireless monitoring via IoT for real-time control.

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