IOT Color Based Object Sorting Machine

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ABSTRACT

The "IoT Colour-Based Object Sorting Machine" is an innovative and automated solution designed for efficient object sorting based on color. This project incorporates Internet of Things (IoT) technology, utilizing a color sensor and a servo motor. The color sensor identifies the color of objects on a conveyor belt, and the servo motor controls the sorting mechanism. The system communicates wirelessly with an IoT platform to enable real-time monitoring and control. This project aims to enhance industrial automation and streamline the sorting process for diverse applications.

Keywords: color sensor, servo motor, microcontroller, IOT connectivity, conveyor belt system, color calibration, user interface.

1. INTRODUCTION

We here, demonstrate the mechanism using a color sensor using sorting mechanism using 3 bins. The system uses Arduino nano connected to a controller circuit to achieve this task. The controller circuit consists of a color sensor attached to it that detect color of a small object in front of it. As soon as the color is detected, a signal is send to the sorter mechanism. This uses a motor to position the sorting tube towards respective section. A feeder is then used to push the object towards the tube. So that it gets sorted and next object is pulled in by the feeder. The action details are sending to the IOT server gecko platform to keep track of the number of objects sorted in each section. Thus, we achieved a completely automated IOT based sorting system. This project is developed with the purpose of reduce labor cost, and human interference.

Proposed System

The proposed IoT Color-Based Object Sorting Machine utilizes a color sensor to identify the color of objects as they move along a conveyor belt. The information is then processed by a micro-controller, and a servo motor controls the sorting mechanism to divert objects into different bins based on their colors. The system is integrated with an IoT platform for real-time monitoring and control. This project provides a reliable and efficient solution for industries requiring precise color-based sorting.

Key Features

1.color sensor:

A color sensor, as the name suggests is a device that sense or detects color. A color sensor will use an external means of emitting light (like an array of

white LED's) and then analyses the reflected light from the object in order to determine its color. In this project, we have designed a simple Arduino color sensor application, which has an ability to detect color.

- Identifies the color of objects on the conveyor belt.

2.Servo Motor:

A servo motor is a rotary actuator or linear actuator that follows for precise control of angular or linear position, velocity and acceleration. It is tiny and lightweight with high output power. This servo can rotate approximately 180 degree (90 in each direction).

- Controls the sorting mechanism to divert objects into different bins.

3. Microcontroller (e.g., Arduino):

Microcontrollers are generally used for low-tomedium complexity specific tasks in equipment. This contrasts with the powerful, numbercrunching microprocessors used in PCs, which handle a variety of software applications.

4. IoT Connectivity:

The "Internet of Things" (IOT) is taking the world by storm and becoming an increasingly growing topic of conversation both in the workplace and outside of it.

- Enables wireless communication for realtime
- monitoring and control.

5. Conveyor Belt System:

- Transports objects for color-based sorting.

6. Color Calibration:

Color-Based Object Sorting is widely used in fruit sorting and candy sorting industries. The system puts forward a mechanism to detect color, sort items using image processing. This mechanism uses a camera, electronic circuitry and sorting mechanism. The system uses Arduino connected to the controller circuit to achieve the task

- Allows calibration of color thresholds for accurate sorting.

7. User Interface (optional):

Provides a graphical interface for monitoring and controlling the system. To make all of this useful, there needs to be a way for users to interact with the IOT system (e.g. a web app with a dashboard that shows different color product bins and allows users to take action). Now to facilitates communication, data flow, device management, and the functionality of applications we need a complete platform which is called IOT platform.
And it's an very important part of IOT ecosystem.

Working principle of IOT color-based sorting machine

Color Based Object Sorting has a wide usage in fruit sorting as well as candy sorting industries. This system puts forward a mechanism to detect color and sort items through image processing. Once identified a mechanism is used to sort the candies into particular bins baskets. We here demonstrate this mechanism using a camera with electronic circuitry along with sorting mechanism using 3 bins. The system uses raspberry pi connected to a controller circuit to achieve this task. The controller circuit consists of a camera attached to it that detects color of a small object in front of it. A motor is used to feed an object to the camera chamber. As soon is the color is detected a signal is sent to the sorter mechanism which uses a motor to position the sorting tube towards respective section. A feeder is then used to push the object towards the tubs so that it gets sorted and next object is pulled in by the feeder. The action details are sent to the IOT server using iotgecko platform to keep track of the number of objects sorted in each section. Thus we achieve a completely automated IOT based sorting system.
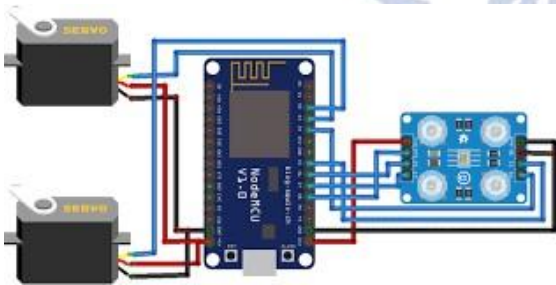
Hardware Tools:

1.Microcontroller (e.g., Arduino):

- Processes color sensor data and controls the servo motor

2.Color Sensor:

- Identifies the color of objects on the conveyor belt.

3.Servo Motor:

- Controls the sorting mechanism to divert objects into different bins.

4.Conveyor Belt System:

- Transports objects for color-based sorting.

5. IoT Module (e.g., Wi-Fi or Bluetooth):
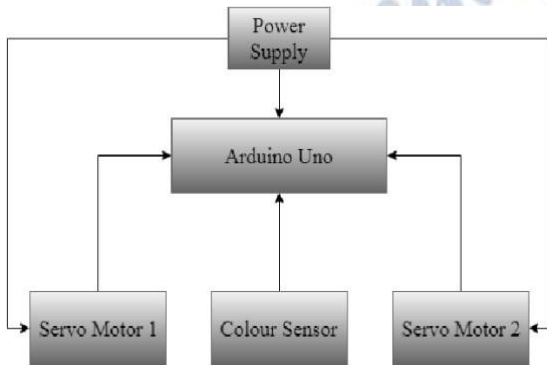
6. Power Source:

Figure 7: Block diagram of the system

Applications

- In food industry to identify rotted fruits and vegetables, in minor scale and big scale productions, to categorize the products established on the several factors.

- In production units to scan and identify the defects in raw materials.

- In fruits and vegetable farming areas (rural areas) where installation of expensive sorters is very difficult.

- In malls (to segregate and separate different clothes, toys, bags etc.) and in small shop

Conclusion

The 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.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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