

GARBAGE SEGREGATION USING COLOR SENSOR

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ABSTRACT

Accumulation of garbage is becoming a serious concern in society which causes contamination of landfills which in turn leads to health hazards. Garbage dumped in large amount makes it difficult to separate manually. This project discusses an IOT based garbage segregation and monitoring system which monitors the garbage level and focuses on segregating the garbage, based on the presence of moisture, plastic or medical waste. Segregating them by the type will facilitate the recycling process which avoids health risk. The process is carried on by the use of sensors along with the IoT module. The sensors are connected to the microcontroller along with a camera. The microcontroller and sensors are configured by using Arduino IDE software. The LCD displays the final output (the type of waste). The website displays bin status (if the garbage is full or filling) along with the type of waste, date and time of the update.

I. INTRODUCTION

The Internet of things is responsible for communication among the objects through the internet, which also helps in transferring and collecting data. There are different IoT ideas to help the society and one of the major discussed topics was to propose an idea to improve efficiency in garbage cleaning making it easier.

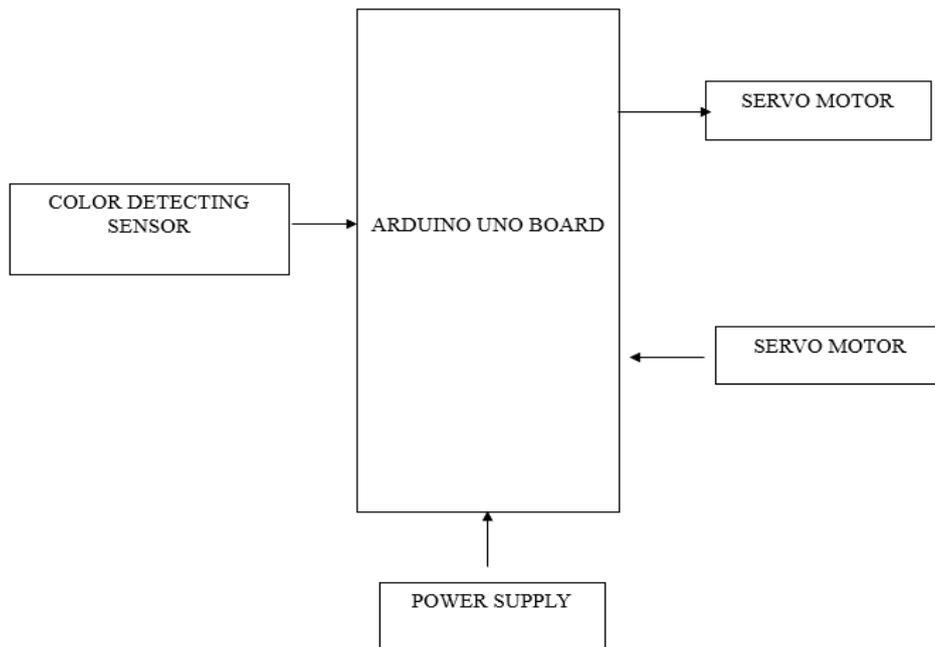
This project concentrates on separating the types of garbage using IoT, where health risk can be avoided. The proposed system concentrates on segregation of garbage which reduces contamination. Release of harmful gases is controlled. The garbage is identified by sensors. The output is displayed in LCD. The IoT module updates the real time status in the website.

II. METHODOLOGY

- **Arduino IDE** is open-source software, designed by Arduino. cc and mainly used for writing, compiling & uploading code to almost all Arduino Modules. It is an official Arduino software, making code compilation too easy that even a common person with no prior technical knowledge can get their feet wet with the learning process
- **Embedded C:** In the development of embedded systems Embedded C is one of the most common and used programming languages. So we can see some of Embedded C's basics and Embedded C's programming framework in this post. It is probably the most common language for Embedded Systems programming.
- **Arduino:** The most standard and popular board used over time is Arduino UNO. The ATmega328 Microcontroller present on the UNO board makes it rather powerful than other boards. There are various types of Arduino boards used for different purposes and projects. The Arduino Boards are organized using the Arduino (IDE), which can run on various platforms
- **Color sensor:** A color sensor is a type of "**photoelectric sensor**" which emits light from a transmitter, and then detects the light reflected back from the detection object with a receiver. A color sensor can detect the received light intensity for red, blue, and green respectively, making it possible to determine the color of the target object. Principle
- **Ultrasonic sensor:** An ultrasonic sensor is a type of electronic equipment that emits ultrasonic sound waves and converts the reflected sound into an electrical signal to determine the distance of a target item. Ultrasonic waves travel quicker than audible sound (i.e. the sound that humans can hear).
- **GSM module:** A GSM module is a circuit that will be used to establish communication between a mobile device or a computing machine and a **GSM** or GPRS system.

- **LCD Display** – Fundamentals. LCD or Liquid Crystal Display is a flat electronic display which is very commonly used in digital watches, calculators, laptops, televisions etc.
- **Servo motor:** The Servo motor is used to start, move and stop conveyor belts carrying the product along with many stages.

III. MODELING AND ANALYSIS



IV. RESULTS AND DISCUSSION

Test Cases

Test id	Test case	Required Input	Expected Output	Actual Output	Test pass/Fail
01	Show the garbage to the sensor	Garbage bag	Detect the bag colour	Colour detected	pass
02	If the bin is full	Garbage bag	Bin is full find the next nearest bin	Message displayed	Pass
03	If the bin is full	Garbage bag	Bin is full find the next nearest bin	Message sent to the garbage collection office	Pass

V. CONCLUSION

Waste sorting is the process by which waste is separated into different elements, waste sorting can occur manually at the household and collected through curbside collection schemes or automatically separated in materials recovery facilities or mechanical biological treatment system.

VI. REFERENCE

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- [4] Embedded System C Programming - javatpoint