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Smart trash picking vehicle for waste management

A. Mounika
mounikajoshi777@gmail.com
Kuppam Engineering College, Ekarlapalle, Andhra Pradesh

V. Gayathri
gayathriv801@gmail.com
Kuppam Engineering College, Ekarlapalle, Andhra Pradesh

Amal Xavier
amalxvellayil@gmail.com
Kuppam Engineering College, Ekarlapalle, Andhra Pradesh

G. Kullai Reddy
kullaireddygudisa@gmail.com
Kuppam Engineering College, Ekarlapalle, Andhra Pradesh

A. Archana
archuanbu92@gmail.com
Kuppam Engineering College, Ekarlapalle, Andhra Pradesh

ABSTRACT

This project aims to design an Automatic trash picking vehicle and is done without human intervention. Garbage collection and management is a large issue undergoing extensive research, and solutions are being proposed accurately. Thanks to an exponential rise in population, there is an increased production of waste, and also a significant amount of litter consisting of plastic, medical waste, paper, and other waste materials are thrown out and dispersed in public. Thus, the need for a most effective waste management strategy is essential. In this project an automated system is provided for segregating types of wastes as biodegradable, non-biodegradable and metallic wastes. The project is built in such a way that, when it is started it will move on the path defined in the program. When it encounters the obstacle, depending on the conditions applied in the program the robot proceeds with further motion and then robot picks up the garbage. Once it senses the color of trash using color sensor, these sensed values are given to the Arduino UNO, and thus based on the inputs from the controller the system will operate and through the operation of various drivers used it will pick up the trash with robotic arm and thus segregation of wastes into Bio-degradable, Nonbiodegradable can be done by dropping waste into the respective bins. Once the bin gets filled the user will get notified.

Keywords: *Color Sensor, Trash, Segregation, Garbage Collector, Arduino, Motor Drivers*

1. INTRODUCTION

Waste management is one among the key difficult issue everywhere the globe. Poorly managed waste results in contamination of the oceans, blockage of drains and spreading of new diseases. The present systems cannot cope up with these volumes of wastes generated by the increasing urban population. The world produces about 2.0 billion tons of municipal solid waste annually, with a minimum of 40 percent of that extraordinarily not managed in an environmentally safe manner. This waste must be managed effectively and expeditiously so as to possess healthy atmosphere to have a friendly environment. The key issues affecting the solid waste management are unscientific treatment, improper assortment of waste, and moral issues. This successively results in hazards things like environmental degradation, water pollution, soil pollution, and air pollution. During this project we have proposed a model for correct assortment and segregation. The wastes are segregated as Bio-degradable, Nonbiodegradable, e-wastes with the assistance of color sensors and the metal wastes are detected using the metal sensor. The robotic arm is provided to pick up the trash followed by sensing the waste based on color using color sensors. After the detection of the type of waste the detected waste is put into the particular dustbins.

2. PROPOSED METHODOLOGY

As shown in the figure1 block diagram represents how the sensors and other components are connected to the Arduino. In our model, system mainly consists of Arduino Uno, DC Geared motor, crystal Oscillator, ultrasonic sensor, color sensor, DTMF decoder, Arm gear motor, 12V battery, L29B motor driver, and 89S52 controller. The system is built on a metallic base which is powered by 12V Battery. The vehicle movement is controlled by programming the Arduino. The vehicle is designed to collect trash at foot path, public places (parks, schools and colleges etc.,). The project is built in such a way that, when it starts it will move along the path defined in the program. When it encounters the obstacle, depending on the conditions applied in the program the robot proceeds with further motion and then robot picks up the garbage.

It moves according to the command given by the Arduino in which the line following coding is dumped. Whenever the

system is on, the vehicle starts moving and once it senses the color of trash using color sensor, these sensed values are given to the Arduino UNO, and thus based on the inputs from the controller it will pick up the trash with robotic arm and thus segregation of wastes into Bio-degradable, Nonbiodegradable can be done by dropping waste into the respective bins. The L29B motor driver, DC gear motor and Arm gear motor helps in the movement of Robotic arm with the control from the Arduino Uno. The power supply is done using the 12V Battery. When the color of the trash is sensed, it will be immediately displayed on the LCD as red color trash picking, green color trash is picking and blue color trash is picking and respective LED will glow. The vehicle can be operated in manual mode also for the movement of vehicle and robotic arm motion by using DTMF decoder 8870IC through mobile keypad. And once the bin gets filled it will be notified to the admin thus, he can empty it and the process continues.

Fig-1: Block diagram of the proposed model

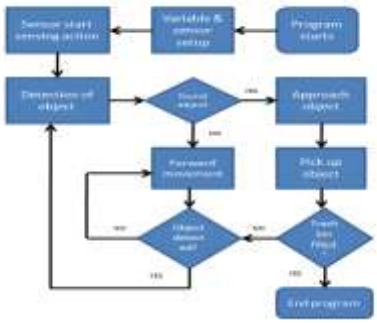

Fig-2: Flow chart of Proposed model

3. CONCLUSION

The proposed project will provide a better waste management system with the proper Integration of Software and Hardware. Managing waste effectively is a present issue of the modern world. So, this project is developed which can collect the waste from railway stations, shopping malls etc. and resulting that reducing the time and effort. This smart system will help to make our environment more suitable for living and making the world healthier.

4.HARDWARE SETUP

Fig-3: Rotatable Mechanical Gripper

Fig-4: Hardware Connections on Wheeled Platform

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