

**PRESENTATION**  
**ON**  
**“AUTOMATED GARBAGE COLLECTOR”**

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## CHAPTER 1

### INTRODUCTION

“Learn tidiness from the cat” is said and acknowledged in Ethiopian culture. The situation past this precept is that keeping the climate clean is very significant and it is utilized to accentuate more on giving thoughtfulness regarding the tidiness. In any case, it isn't as simple as to stand up the adage to adequately and appropriately dealing with the trash. We every now and again notice trash containers being filled over and extra waste materials being arranged and gathered around the canister in various urban communities of Ethiopia. Those inappropriately arranged trash will be the abode for different number of hazardous miniature living beings, creepy crawlies and mosquitoes to raise on. Along these lines, serious and infectious illness is animated and furthermore awful stench emerges from it and may cause sickness to individuals.

The district of most urban areas in Ethiopia has strived its best to lighten this issue by giving a few trash canisters all through the town. Nonetheless, it is manual methodology and a number of trucks from the metropolitan authority are shipped off the waste receptacles to gather the waste. The squanders are stacked to the truck and passed on to the pre-determined areas. In view of this the classification of the individuals engaged with gathering and shipping the squanders are generally not capable enough to make the job done the right way. Regularly the squanders are not gathered from every single waste container appropriately because of metropolitan specialists didn't have data about the trash container.

The manual waste assortment and the board approach has issues such as absence of data about the gathering time and spot. In view of this it is tedious and less powerful for example trucks go and may get vacant trash receptacle. For the most part, there is absence of legitimate observing framework to follow all exercises identified with squander the executives and absence of shrewd checking of the state of the container.

This proposed paper shows compelling answer for deal with the trash. This trash screen is actualized utilizing sensors and Arduino microcontroller. The subtleties of every dustbin are observed by the civil specialists with the assistance of GUI.

The usage of trash observing framework utilizing sensors, microcontrollers and GSM module guarantee the cleaning of dustbins soon when the trash level arrives at its most extreme and furthermore tell the individuals not drop the residue outside of the dustbin when they attempt to dump it out of canister by detecting their movement.

On the off chance that the dustbin isn't cleaned in explicit time, at that point the record is shipped off the higher approved office who can take proper activity against the concerned contractual worker.

This framework additionally assists with checking the phony reports and consequently can decrease the debasement in the general administration framework. This diminishes the all-out number of outings of trash assortment vehicle and lessens the general consumption related with the trash assortment. It extreme assists with keeping cleanness in the general public and consequently the extension of infection brought about by squander material is diminished.

## 1.2 statement of problem

Presently days in most Ethiopian urban areas there are numerous dustbins which are in awful conditions. The trash in a dustbin is totally flooded and furthermore illuminated of the dustbin. Numerous individuals are tossing trash on that dustbin which are now full or flooded. Because of this messy of trash canisters terrible stench is made and furthermore harmful and unhygienic gases which are terrible for the climate is created. This makes an extremely terrible look of the city which is an approach to help to the air contamination and to some destructive infections which are effectively spreadable.

A big challenge in the urban cities is solid waste management. The garbage collecting authority in traditional waste management system doesn't know about the level of garbage in dustbin, if the dust bins gets full by garbage then it gets overflowed as well as spelled out from the dustbin leading to unhygienic condition in cities.

People throw garbage on that dustbin which is already overflowed. Sometimes due to unclean garbage bins bad smell arises also toxic and unhygienic gases are produced which is way to support to the air pollution and to some Vol-4 Issue-3 2018 harmful diseases which are easily spreadable. It is very bad look of the city. Use of traditional system result in inefficient and time and money spending system

## 1.3 objective

### 1.3.1 General objective

The main objective of this project is to design and implement the automated garbage monitoring system

### 1.3.2 Specific objectives

1. To investigate the works performed so far to screen the trash
2. Propose and plan a trash observing framework that can be controlled with GUI
3. Reproduce the plan utilizing Arduino microcontroller
4. Execute the recreated plan alongside equipment and programming determinations

The primary aim is to introduce a way in which garbage could be collected and disposed efficiently; To analyze the problem of garbage disposal at a school, restaurant, office, hotel, production plant or any other suitable location; To design and develop a system for solving the problem; To test and maintain the implemented system. Method: Our project is divided into two main parts. We are designing a system that collects garbage automatically through line. For which we are designing an arena so that the machine will follow the specific path and also manually by using Arduino and Bluetooth module. The machine can be controlled by software which will give command to the robotic jaw to collect the stationary waste. It also has the characteristic to get controlled by voice command which makes the robot to collect the garbage according to the given command. Findings: We have designed a semi-autonomous garbage collector robot which can do multiple functions. This robot has one robotic arm in which it can pick the garbage and dispense it in main basket attached to the robot. The camera placed on robot helps the administrator to remotely monitor the robot while collecting garbage. The prototype has an electronic mechanism by which the robot can dispense it collected garbage to the dispensing point. This robot has installed batteries in which there is no fuel or electricity required to complete the operation.

## CHAPTER 02

### LITERATURE SURVEY

#### 1.4 Related works

In strong waste container observing framework trash receptacle set the public spot then Camera set for trash canister area. The camera caught picture for trash canister. Radio Frequency Identification (RFID), GPS and GIS send picture for work station. The RFID peruses and camera are mounted in the truck, when truck comes nearer to the container RFID peruse conveyed RFID tag. and send all data. The System is utilizing controlling Hut. This Controlling Hut is SMS Technology. The GPS and GPRS planning worker to breaking down information of different area. The control station incorporated all the data and put away in the framework information base.

The container status and waste truck were observed. [1] In [2], they went to a point It is imperative to comprehend the cultural worries over the expanded pace of asset utilization and waste creation and subsequently the arrangement creators have supported reusing and reuse methodologies to lessen the interest for crude materials and to diminish the amount of squander going to landfill. In [3], it is being proposed in this paper that presentation

of an incorporated framework joined with an incorporated arrangement of Radio Frequency Identification, Global Position System, General Packet Radio Service, Geographic Information System and web camera will take care of the issue of strong waste. They moreover dissected the real presentation of the framework. In [4] portrayed that significant test in metropolitan regions all through the world is the executives of strong waste.

In that framework, presented a coordinated framework joined of Radio Recurrence Identification (RFID), Global Position System (GPS), General Packet Radio Services (GPRS), Geographic Information System (GIS) and Web camera. The RFID peruse is underlying truck would naturally recover a wide range of client data and receptacle data from RFID tag, mounted in each container. GPS is utilized to give the data of area of assortment truck. All the data of the middle worker would refresh. The data is refreshed through GPRS correspondence framework. GIS map worker is utilized for truck checking.

In this System container just as data set has created in the manner that data of receptacle as well as truck ID, information and season of waste assortment, receptacle and truck GPS facilitates data. Receptacle status and measure of squander are assembled in information bundle.

The system is indicated that continuous picture handling and other receptacle data have been shown in the GUI. [5] portrayed framework utilized two innovations. Zigbee and Global Framework for Mobile Communication (GSM) are the most recent patterns. This mix is truly outstanding blends which is utilized in that framework. There are number of procedures which are utilized just as are being develop for well administration of

trash. To give portrayal of the framework, the sensors are set in like manner trash receptacles, which is place at public spots. In that ARM7 regulator is utilized when the trash comes to the level of the sensor, at that point the sign will be given to microcontroller.

This ARM7 regulator will give data to the driver of trash assortment truck with regards to which trash container is totally filled. ARM7 will give sign with the assistance of GSM innovation by sending SMS. In [6] portrayed a framework is produced for to predominantly, focus on killing offensiveness as well as confusion. The keen junk utilizes two sensors specifically IR and gas sensor. IR sensor is utilized for to detect the degree of the refuse inside the canister and gas sensor will detect poisonous gases.

When the rubbish is filled, the RFID put inside the waste will give data about flooding of refuse to the company office. The existing trash observing framework all through the nation is completely manual. The assortment cycle is a sort of attempt and blunder. The dump truck visits the trash containers at fixed stretch span. This cycle has a bunch of hindrances on the grounds that dependent on the home number and their utilization some trash canisters may get full before a week and others may get full in about fourteen days; etc.

Therefore, it is being a reason for time dispersal and a fitting financial use. These and other unmentioned phenomena portray the wasteful part of the current framework. We accept that our new mechanized trash checking framework can evade the brought issue up in a powerful manner through applying Arduino Microcontroller and Sensor based advances.



## CHAPTER 03

## CHAPTER 03

**PROPOSED METHODOLOGY****1.5 Block diagram of the system**

The whole framework comprises a handset framework, implies that it included both the sending and accepting units. On usage measure the sending some portion of the framework put alongside the trash canister while the accepting piece of the framework situated at the controlling room of the approved head, at the region office.

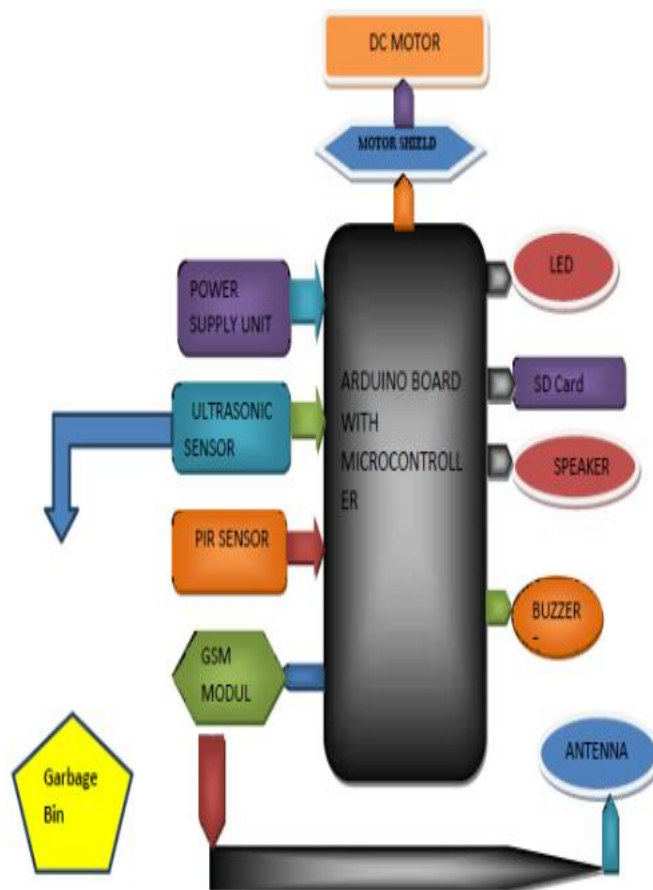


Figure 1: Block diagram of the proposed system at transmitter side



Figure 2: Block diagram of the system at receiver side

## 1.6 Description of block diagram

The principal block outline speaks to the framework at the sending part or the spot of the trash canister. In this part as the ultrasonic sensor sense the degree of the container and sends the information to the Arduino and the Arduino measures the information from ultrasonic sensor. Contingent upon the information handled the status of the trash in the trash receptacle is educated to the general public through the LED.

At the point when the trash status is high or full the data is passed to the control room through GSM and the PIR sensor begins to detect the movement around the receptacle and advise the encompassing individuals not to drop the trash outside the container while the receptacle is full. Then again, the subsequent square outline portrays the getting side of the framework so that it gets the information from the sending part and cycles it. The bell gives a caution when information is gotten also, shows the information on LCD.

When the information is shown on LCD the regulator from the control room send the SMS to the versatile of driver to gather the canister rapidly through GSM.

## 1.7 Methodology

### 1.7.1 Software methodology

For building up the product part of the framework we utilize Rapid Application Development (RAD) model since this model takes iterative plans to the extraordinary and as opposed to utilizing cycles enduring years. The fig beneath shows the period of RAD model.

**Prerequisites arranging**—the whole gathering part concurs on the project's objective on planning creating also, actualizing the graphical UI at accepting part. The necessities are indicated in a manner that they don't limit later formative change.

**Client configuration**—colleagues cooperate to change over the necessities into a working plan.

**Development**—all individuals from the gathering take an interest on building an application.

**Cutover**—finally we give a completed windows application

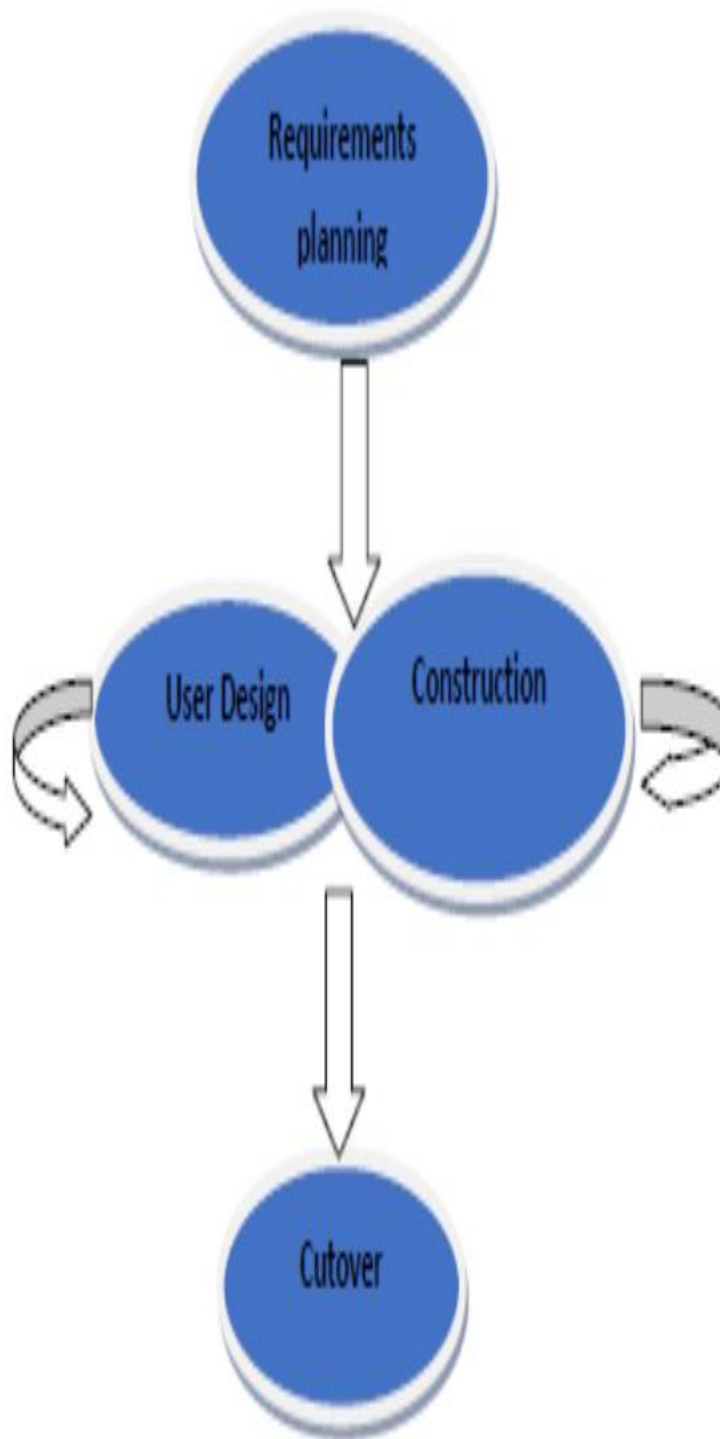


Figure 3: RAD model phases

## 1.7.2 Hardware methodology

The fig below describes the methodology we use the to design hardware part of the system

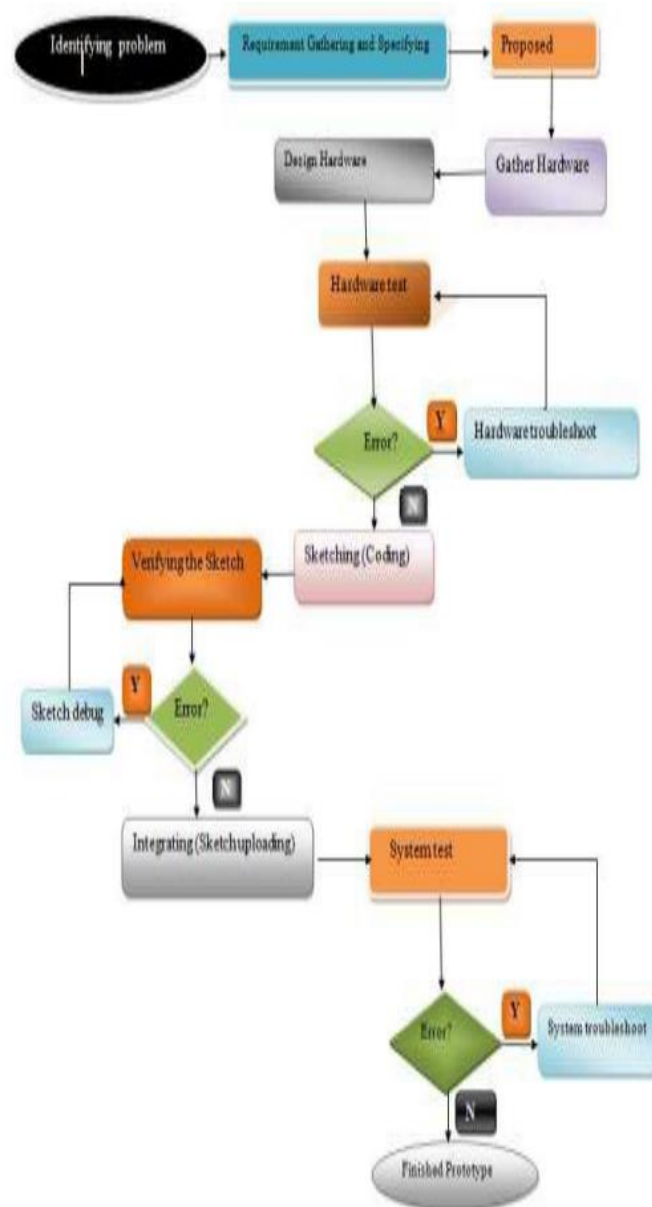


Figure 4: Flowchart for hardware design methodology

## 1.8 Flowchart of the overall system

The figure below shows that the overall flowchart diagram of the implemented automated garbage monitoring system.

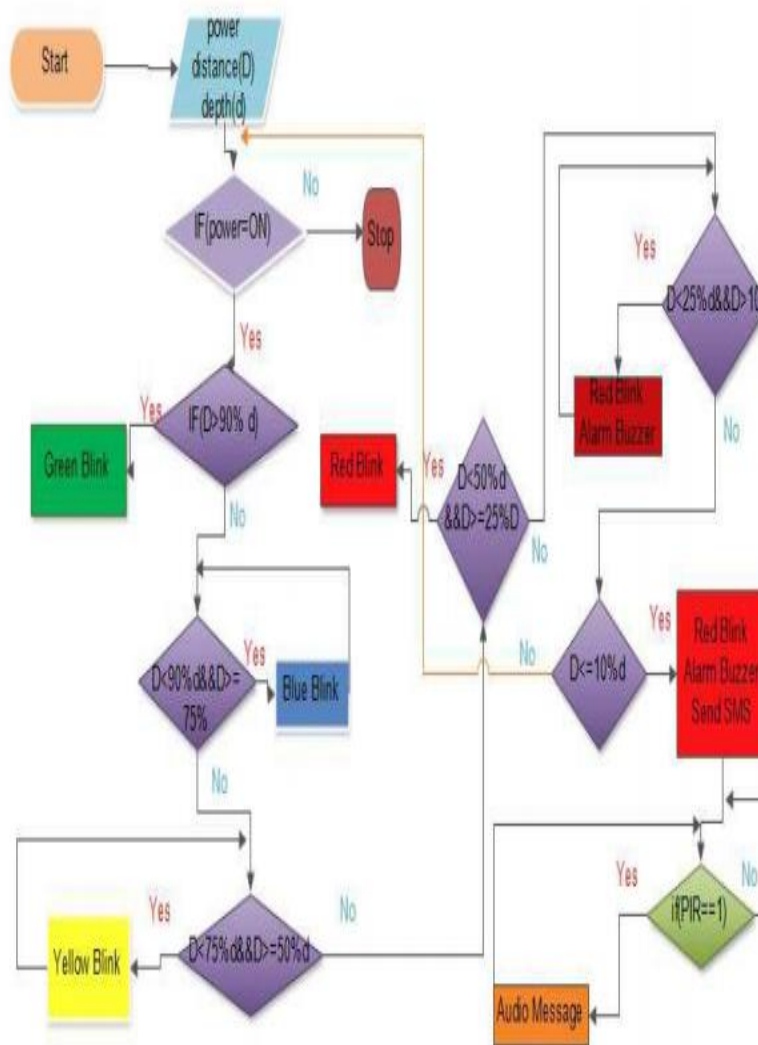


Figure 5: Flowchart of over all system

## CHAPTER 04

### PROJECT DESCRIPTION

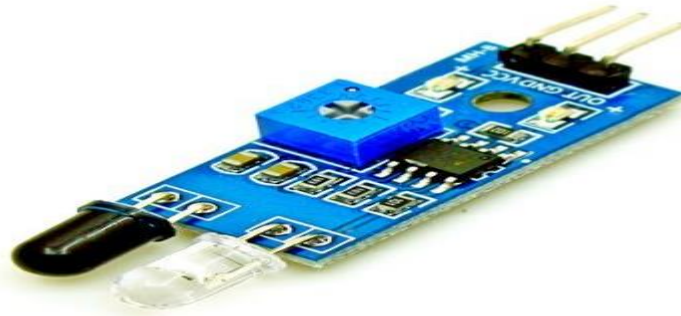
#### IR Sensor

An IR sensor contains IR LED and a photodiode. The IR LED will be continuously emitting the IR rays and the photodiode will act as a receiver to the IR rays emitted by the IR LED. Whenever the IR rays emitted by the IR LED hits an object (Note: the surface shouldn't be black color), the rays are reflected back.

If the photodiode receives the IR rays emitted by the IR LED, then the output of the IR sensor is digital high. If the photodiode doesn't receive any IR rays emitted by the IR LED, then the output will be digital low. When it comes to the operating voltage of the IR sensor, it operates on 5V and the output of the IR sensor module is either 5V (high) or 0V (low).

There are two types of infrared sensors: active and passive. Active infrared sensors both emit and detect infrared radiation. Active IR sensors have two parts: a light emitting diode (LED) and a receiver. When an object comes close to the sensor, the infrared light from the LED reflects off of the object and is detected by the receiver. Active IR sensors act as **proximity sensors**, and they are commonly used in obstacle detection systems (such as in robots)



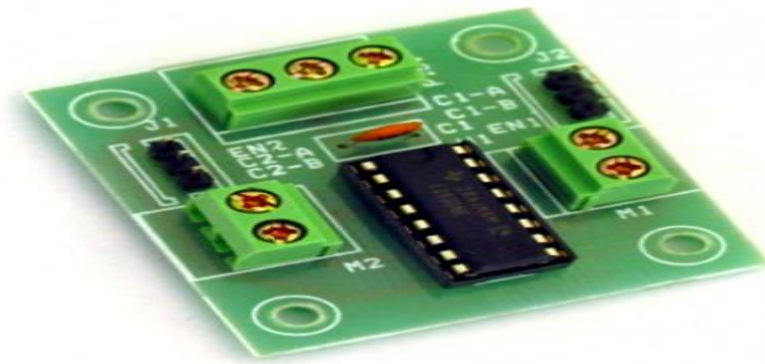


## L293D Motor Driver Module

The L293D module is a dual h-bridge motor driver circuit. By using the L293D module, we can control two motors at the same time. it can also drive the motor in either of the direction, which makes it perfect for any robot projects. The operating voltage of the module ranges from 4.5V to 12V. The output current of the module is 1A per channel. The module's pinout is shown in the below picture.

SunFounder L293D is a monolithic integrated, high voltage, high current, 4-channel driver. Basically this means using this chip you can use DC motors and power supplies of up to 16 Volts, thats some pretty big motors and the chip can supply a maximum current of 600mA per channel, the L293D chip is also what's known as a type of H-Bridge. The H-Bridge is typically an electrical circuit that enables a voltage to be applied across a load in either direction to an output.

The L293D is quadruple high-current half-H drivers. It is designed to provide bidirectional drive currents of up to 600-mA at voltages from 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar stepping motors.



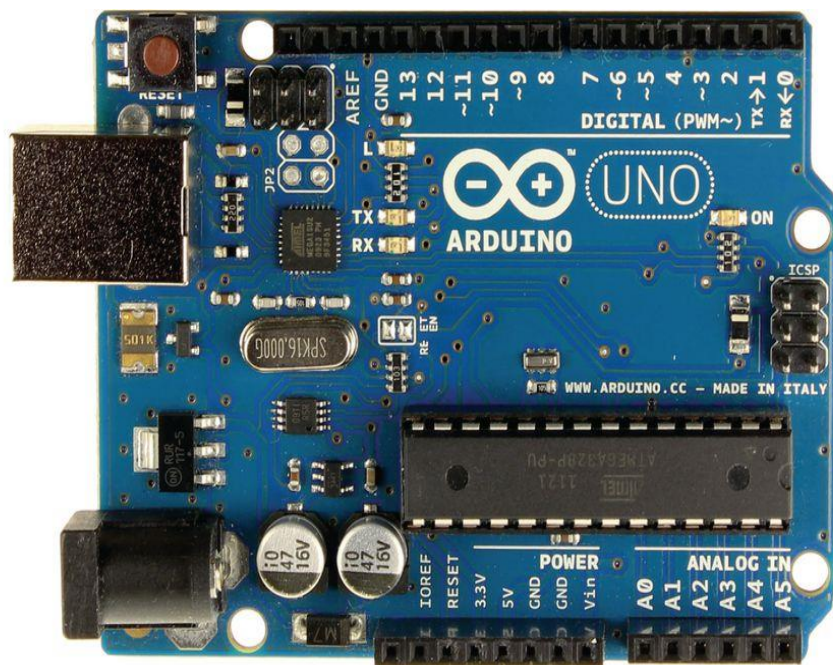
## ARDUINO UNO

The Arduino Uno is an open-source microcontroller board dependent on the Microchip ATmega328P microcontroller and created by Arduino.cc.[2][3] The board is outfitted with sets of advanced and simple information/yield (I/O) sticks that might be interfaced to different extension sheets (shields) and other circuits.[1] The board has 14 computerized I/O pins (six fit for PWM yield), 6 simple I/O sticks, and is programmable with the Arduino IDE (Integrated Development Environment), by means of a sort B USB cable.[4] It can be controlled by the USB link or by an outer 9-volt battery, however it acknowledges voltages somewhere in the range of 7 and 20 volts. It is like the Arduino Nano and Leonardo.[5][6] The equipment reference configuration is circulated under a Creative Commons Attribution Share-Alike 2.5 permit and is accessible on the Arduino site. Design and creation documents for certain renditions of the equipment are additionally accessible.

"Uno" signifies "one" in Italian and was picked to check the underlying arrival of Arduino Software.[1] The Uno board is the first in a progression of USB-based

Arduino boards;[3] it and form 1.0 of the Arduino IDE were the reference adaptations of Arduino, which have now advanced to more up to date releases.[4] The ATmega328 on the board comes prearranged with a bootloader that permits transferring new code to it without the utilization of an outer equipment programmer.[3]

While the Uno imparts utilizing the first STK500 protocol,[1] it contrasts from all previous sheets in that it doesn't utilize the FTDI USB-to-chronic driver chip. All things being equal, it utilizes the Atmega16U2 (Atmega8U2 up to rendition R2) modified as a USB-to-sequential converter.[7]



## DC MOTOR

A DC motor is any of a class of rotary electrical motors that converts direct current electrical energy into mechanical energy. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or electronic, to periodically change

the direction of current in part of the motor.

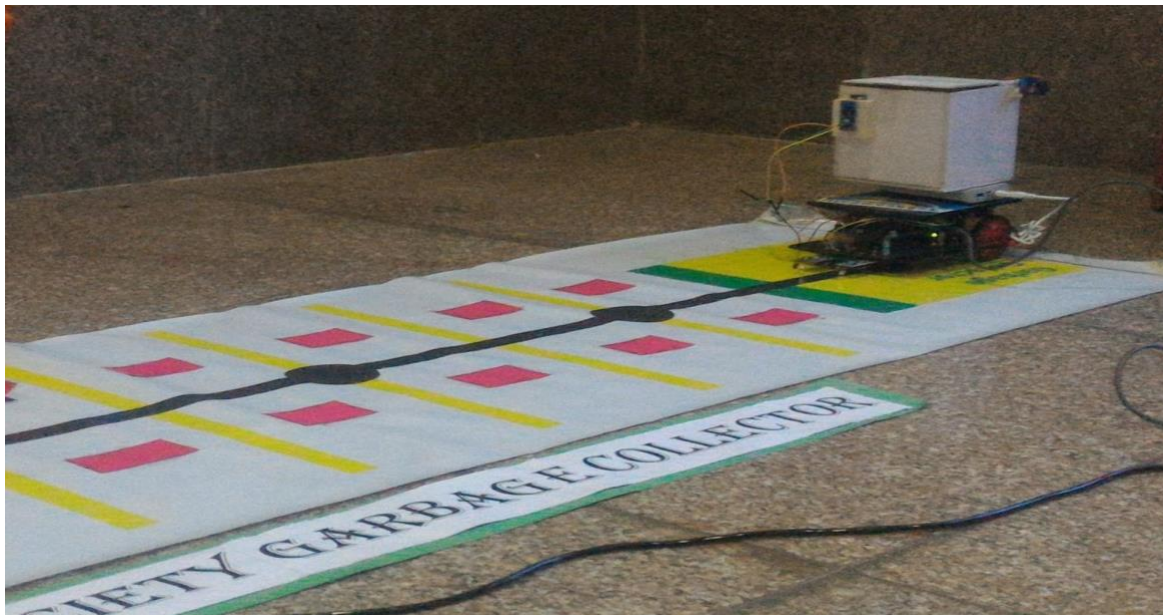
DC motors were the first form of motor widely used, as they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances.

The universal motor can operate on direct current but is a lightweight brushed motor used for portable power tools and appliances. Larger DC motors are currently used in propulsion of electric vehicles, elevator and hoists, and in drives for steel rolling mills. The advent of power electronics has made replacement of DC motors with AC motors possible in many applications.



## CHAPTER 05

### RESULT AND DISCUSSION



The line follower, as the name implies, is an automated self-driven vehicle (which follows line). In general, there are two types of line follower. In one type, the line follower follows the black line on the white surface, whereas, in the other type, it follows the white line on the black surface. These types of line followers are used in the industries, food restaurants for food delivery, the medical field for transmitting the medicine to the required patients, etc. Now, we will be building a line following robot by using mainly IR sensors, L293D, and a micro control.

We will be using a black tape as a track. If the sensor comes on top of the black track, the output of the sensor will be digital low, and if the sensors are not facing the black track the output of the sensor will be digital high. So, we will position

our sensors in such a way that each sensor should be placed on either side of the black track and must be in height sufficient to sense the variation of the track. When the right sensor is giving an output of digital low.

It means that the line follower is crossing the black track from the right side. At this condition, we need to stop the righthand side motor. If the same condition arises for the left sensor, we need to stop the left side motor. If both the sensors are giving digital high, we need to switch on both the motors.

If you have connected the components correctly, the end product looks more or less like this. Just place the line follower on the track and see how it follows the line. You could build this along with your friends, and keep competition among yourselves to check which robot will complete the track in a short time.



## CHAPTER 06

### CONCLUSION AND FUTURE SCOPE

In this paper an Arduino sensor based robotized trash observing framework is created to screen the trash through the city. The framework is more compelling in illuminating the districts about the status regarding the trash at trash receptacle area when the status of the trash turns out to be full. Estimating the degree of the trash furthermore, educating the general public and regions about at which level the trash is and illuminating the driver to gather the trash is the fundamental component that is created in the venture which makes the framework more solid and productive. The movement location system is finished by PIR sensor to that utilizes infrared waves to discover the presence of an article towards the container while the trash is full.

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The movement location system is finished by PIR sensor to that utilizes infrared waves to discover the presence of an article towards the container while the trash is full. The interface and programming can be adjusted and redeveloped by the prerequisite of the framework for various city municipals with additional examination to support its effectiveness and performance. Although the improvement of the computerized trash checking framework is great, there are things to be prescribed to chip away at it later on.

Most importantly it is prescribed to add camera to the framework to catch the picture of the encompassing while the individuals attempt to drop the trash outside the canister which we will be utilized for punishment and to add smell sensor and dampness sensor to detect the climate also, receptacle dampness so it will have more productivity and basic ease of use. He interfaces and programming can be adjusted and redeveloped by the prerequisite of the framework for various city municipals with additional examination to support its effectiveness and performance.

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## APPENDIX

```
#define en1 9
#define input1 6
#define input2 7
#define en2 11
#define input3 10
#define input4 8
#define L_sensor 4
#define R_sensor 3

Value = (voltage needed/5) * 255.

void setup() {
  pinMode(en1, OUTPUT);
  pinMode(en2, OUTPUT);
  pinMode(input1, OUTPUT);
  pinMode(input2, OUTPUT);

  pinMode(input3, OUTPUT);
  pinMode(input4, OUTPUT);
  pinMode(L_sensor, INPUT);
  pinMode(R_sensor, INPUT);
  Serial.begin(9600);
  analogWrite(en1,250);
  analogWrite(en2, 250);
}

void loop() {
  if((digitalRead(L_sensor) == HIGH) && (digitalRead(R_sensor) == HIGH)){
    Serial.println(" Left and Right sensors are high");
    digitalWrite(input1, HIGH);
    digitalWrite(input2, LOW);
```

```
digitalWrite(input3, HIGH);
digitalWrite(input4, LOW);
}
else if((digitalRead(L_sensor) == HIGH) && (digitalRead(R_sensor) == LOW)){
    Serial.println(digitalRead(L_sensor));
    Serial.println(digitalRead(R_sensor));
    digitalWrite(input1, LOW);
    digitalWrite(input2, LOW);
    digitalWrite(input3, HIGH);
    digitalWrite(input4, LOW);
}
else if((digitalRead(L_sensor) == LOW) && (digitalRead(R_sensor) == HIGH)){
    Serial.println(" Left Low");
    Serial.println(digitalRead(" Right HIGH"));
    digitalWrite(input1, HIGH);
    digitalWrite(input2, LOW);
    digitalWrite(input3, LOW);
    digitalWrite(input4, LOW);
}
else {
    digitalWrite(input1, LOW);

    digitalWrite(input2, LOW);
    digitalWrite(input3, LOW);
    digitalWrite(input4, LOW);
```

}

}