

# Garbage Management System

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## Abstract:

In India, the SWACCHA BHARAT ABHIYAN is a mission launched by our Prime Minister with the goal of cleaning up the roads, streets, and developing the digital infrastructure of India's cities and rural areas. We have given an effective method for monitoring the waste level in real time, with a focus on the Clean India agenda. The concept is simple, and it is motivated by the fact that dustbins must be cleaned on a regular basis, which is not always practical. As a result, the environment becomes unhealthy, and diseases spread.

Environmental sanitation is critical for a healthy lifestyle. Garbage bins are commonly kept without sufficient monitoring in our daily lives until they are filled to the point of overflowing and spilling out, resulting in environmental contamination that poses major health risks to humans and the environment. The garbage dustbin's level ultrasonic sensors continuously detect the rubbish level, and the system relays this information to the control office. This will prevent the garbage cans from overflowing. We see that in our cities, public bins are overflowing, resulting in unsanitary circumstances for people and a foul odour. To avoid all of this, we will create a waste monitoring system based on the Internet of Things. These bins are connected to an Arduino Uno base system equipped with an ultrasonic sensor.

**Keywords:** Ultrasonic sensor, Smart Bin , Arduino , GSM

## 1. Introduction:

Due to increase in population of India it also leads to increase in the wastes also. India faces major environmental challenges associated with inadequate waste collection, transport and disposal. So we tried to make an system where garbage management can be done using smart ways like IOT, using smart components etc.

- There is no mechanism to detect waste levels or update the condition of the bins to the appropriate authorities.
- There is a lack of data about collection times, disposal times, and collection locations. There is no mechanism to alert garbage collectors in real time to collect rubbish as soon as possible.

## 2. Problem Statement:

- So, we know that In India the concept of smart dustbin is not been used.
- There is no central monitoring of different waste bins and waste collectors/trucks in real time.

## 3. Hardware Components:

- **Arduino Uno:** The Arduino Uno R3 is a microcontroller board that uses a detachable ATmega328 AVR microprocessor in a dual-inline-package (DIP) format. There are 32 pins available on it . A 16 MHz resonator, a USB connection, a power jack, an ICSP header, and a reset button are all included.

It comes with everything you need to get started with the microcontroller; simply plug it into a computer with a USB cable or power it with a battery.

- **GSM module(sim800A):**

The SIM800A Quad-Band GSM/GPRS Module with RS232 Interface is a full Quad-band GSM/GPRS solution in LGA (Land grid array) form factor that can be incorporated in customer applications.

When the bin is about to fill, a GSM module is used to send a message to an authorized Group. Text messages are used to communicate and to keep track of the condition of the bin.

- **LCD display:**

A 16x2 LCD can display 16 characters per line on each of its two lines. Each character is displayed in a 5x7 pixel matrix on this LCD. The 224 distinct characters and symbols can be displayed on the 16 x 2 intelligent alphanumeric dot matrix display.

- **Ultrasonic sensor (HC-SR04):**

An ultrasonic sensor is a device that uses ultrasonic sound waves to determine the distance to an item. A transducer is used in an ultrasonic sensor to emit and receive ultrasonic pulses that relay information about the proximity of an item.

#### **4. Software Used:**

- **Proteus 8.11:**

The Proteus Design Set is a proprietary software tool suite that is primarily used to automate electronic design. Electronic design experts and technicians use the software to develop

schematics and electronic prints for printed circuit board manufacture.

- **Arduino Ide:**

The Arduino Software (IDE) includes a text editor for writing code, a message area, a text console, a toolbar with buttons for basic functions, and a series of menus.

#### **5. Objectives:**

- So, our main focus is to make a monitoring system where we were able to display the Realtime level of garbage inside the smart bins using ultrasonic sensors.
- And secondly, we tried to develop system where we used an GSM module to send notifications or SMS to authority about garbage level so that they can replace bins at accurate time.

#### **6. Methodology:**

- So are project start with Arduino uno board where we uploaded the codes for the working of ultrasonic sensor, LCD and GSM module. Now project starts with ultrasonic sensor it will go on detecting the garbage level inside the bin. We have used 4 conditions like
  - 1.1 If the range is in between 100 to 80 Inch, then it is empty.
  - 1.2 If the range is in between 80 to 45 inches, then it is half filled.
  - 1.3 If the range is in between 45 to 10inches, almost full.
  - 1.4 If the range is in between 10 to 1 inch, then it is full.

So, if bins are full then SMS will be sent to authority (Mobile no. we have mentioned in code). And else dustbins are not fill then it will show on lcd that bins are empty.

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## Workflow:

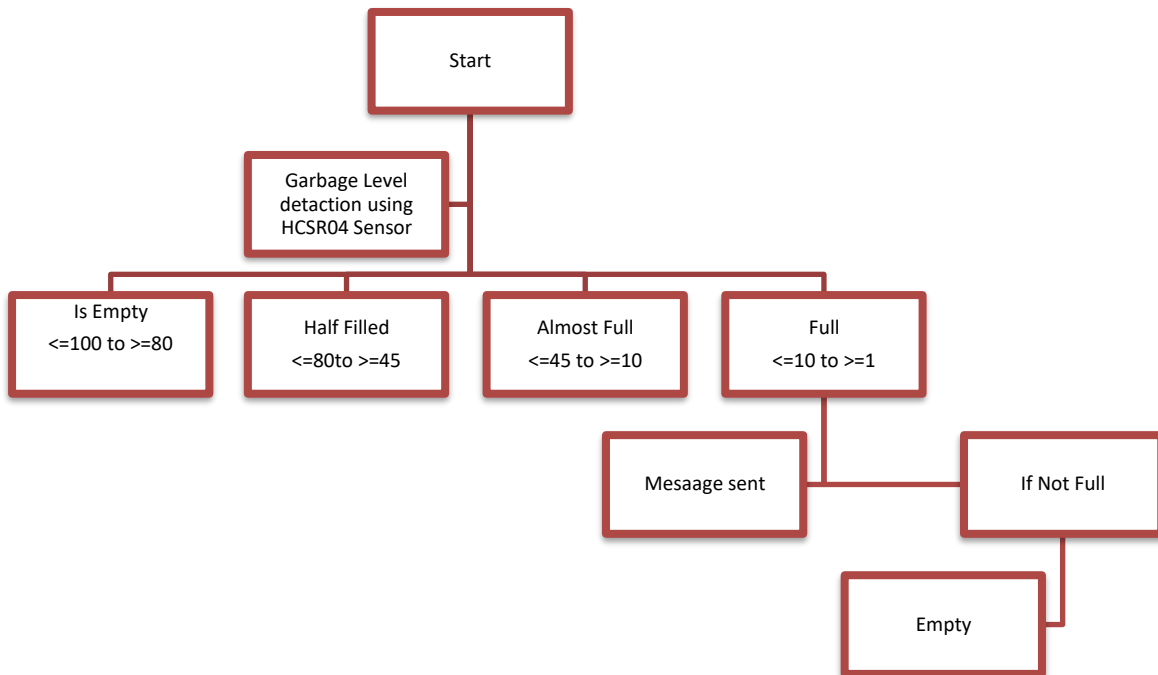


Figure A: Workflow of Garbage Management System

## 7. Results

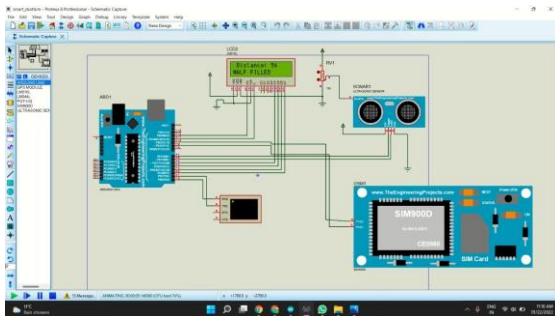


Fig: Simulation of Project.

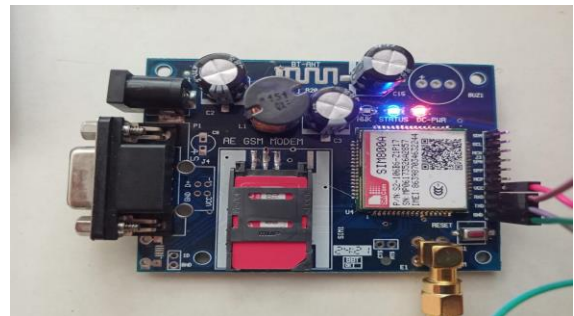


Fig:3



Fig:2

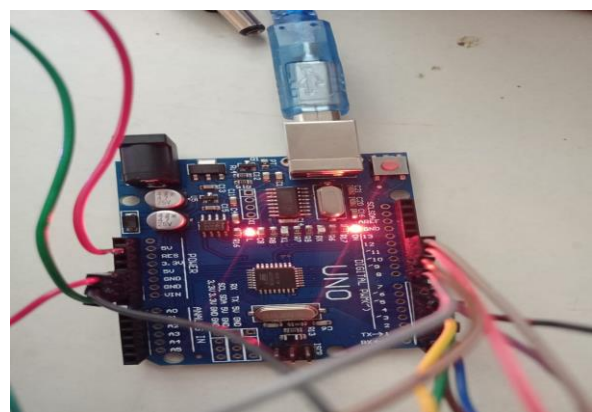
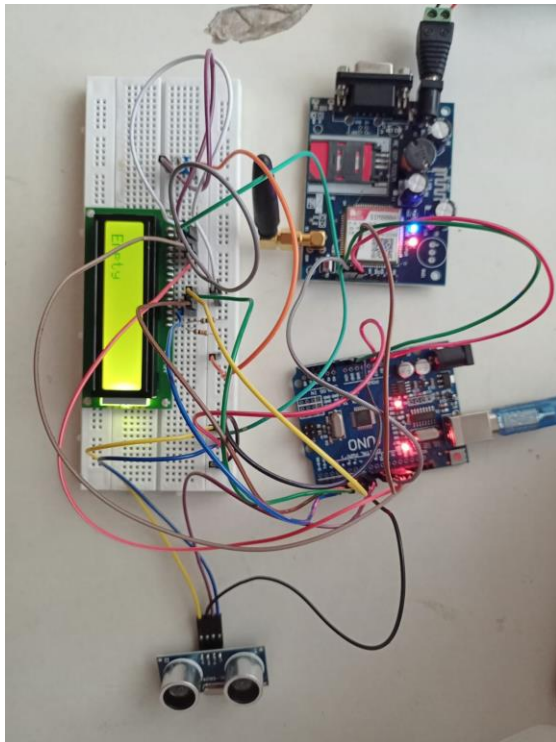


Fig:4



**Fig:5**

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the first figure the whole simulation of our project in proteus and fig2, fig3, fig4, fig5 are the hardware implementation of project.

## 8. Conclusion and Future Work:

### a. Future scope:

- Now this system can be used in certain developed areas but as soon as it proves its credibility it can be used everywhere such as cities, villages etc. In future, a team can be made which will be in charge for handling and maintaining this system.
- So in future we can make a portal and android application in which all information of bins can be collected.
- We can increase the functionality of our system by adding more sensors like PIR sensor, gas sensor etc.
- Here we use only GSM module but in future we can use GPS module to track the location of dustbins.

### b. Conclusion:

So form this proposed system we want to keep cities clean and Green. And we hope that this system will be used by Administration for Swatch Bharat Aryan.

And also this system is able to monitor the garbage level in the bin, avoid the overflow of garbage by notifying the collector via an SMS. The system provides an efficient and effective way of garbage collection.

## 9. Acknowledgement

We would like to thank our **Prof Suhas bhise** who gave us the opportunity to do this kind of project, which made us learn a lot of new things and to develop a logical thinking which will be very beneficial for all the group members. And we are thankful to them.

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