

Smart Dustbin

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Abstract: *The production of waste is rising as urbanisation spreads quickly. Waste management is an important factor to take into account in public areas when waste overflows from the bins and may cause various diseases. The goal of the current effort is to create a smart dustbin model that can be successfully deployed in public areas of smart cities. The model includes two trash cans, designated as Dustbin A and Dustbin B, which will primarily be kept in public spaces. Dustbin B cannot be used until Dustbin A is completely full, however Dustbin A may be utilised. Once Dustbin A is full, Dustbin B can only be utilised since Dustbin A won't open until the garbage in Dustbin A is removed. Every time a trash can is full, a communication is sent to the appropriate authority. This will prevent the trash can from overflowing. Depending on whether an obstruction is present, trash cans have an automatic close and open feature. Our system uses an ultrasonic sensor to measure the quantity of trash in the trash cans, IR sensors to detect the existence of obstacles, and a GSM system to send information to the authorised control room..*

Keywords: Smart Dustbins, Arduino, Ultrasonic sensor, GSM, Waste management, IR sensor

I. INTRODUCTION

We have to deal with one awful difficulty because the planet is going through a stage of upgrading. Garbage! We frequently see images of garbage cans that are overflowing with trash and spilling out. Due to the enormous number of insects and mosquitoes that nest there, this increases the number of diseases. Solid waste management is a major issue in urban areas, not just in India but in most other nations as well. Therefore, a system that can eliminate this issue or at the very least scale it back to the absolute minimum must be developed. The project offers us one of the most effective ways to maintain a clean, green atmosphere. We have to deal with one awful difficulty because the planet is going through a stage of upgrading. Garbage! We frequently see images of garbage cans that are overflowing with trash and spilling out. Due to the enormous number of insects and mosquitoes that nest there, this increases the number of diseases. Solid waste management is a major issue in urban areas, not just in India but in most other nations as well. Therefore, a system that can eliminate this issue or at the very least scale it back to the absolute minimum must be developed. The project offers us one of the most effective ways to maintain a clean, green atmosphere[2]. The majority of people prefer to buy at supermarkets these days. This is due to the wide variety of items available, ranging from basic necessities to raw materials. As more and more people frequent the grocery, a lot of trash has begun to accumulate. As a result, the trash can sometimes overflow since it is unable to handle the garbage. This kind of circumstance occurs frequently everywhere, not only at the grocery store. This issue arises as a result of the cleaning department's lack of sensitivity to the issue of an overflowing and overstuffed trash can[3].

II. PROPOSED DESIGN AND WORKING PRINCIPLE

The system being proposed uses two dustbins, where the second Dustbin B cannot be used until and unless the first Dustbin A is completely filled. Dustbin A will not open until the garbage is cleaned from the bin A, hence Dustbin B must only be used once Dustbin A is full. Two IR sensors are installed at the front of the dumpsters so that anytime someone approaches the dustbin, a servo motor opens and closes it automatically. Additionally, an ultrasonic sensor is positioned within the bins to gauge how full they are. A message is transmitted to the relevant authority through GSM module once Dustbin A or B are full[1]. The proposed system will aid in preventing dustbin overflow, which is a problem in the present day due to the breeding of mosquitoes and houseflies, which are a major source of

diseases like malaria, dengue, and chikungunya, among others. Additionally, headaches and an increase in stress are brought on by this. It will provide up-to-date information on the dustbin's level. When the trash can is full, it will immediately convey the message. dustbin placement based to actual requirements. This system has low cost. The resources are conveniently accessible. reduces odours and makes cities cleaner, improving the quality of the environment. It opens on its own without needing to touch the lid. It is important to maintain a clean environment[2].

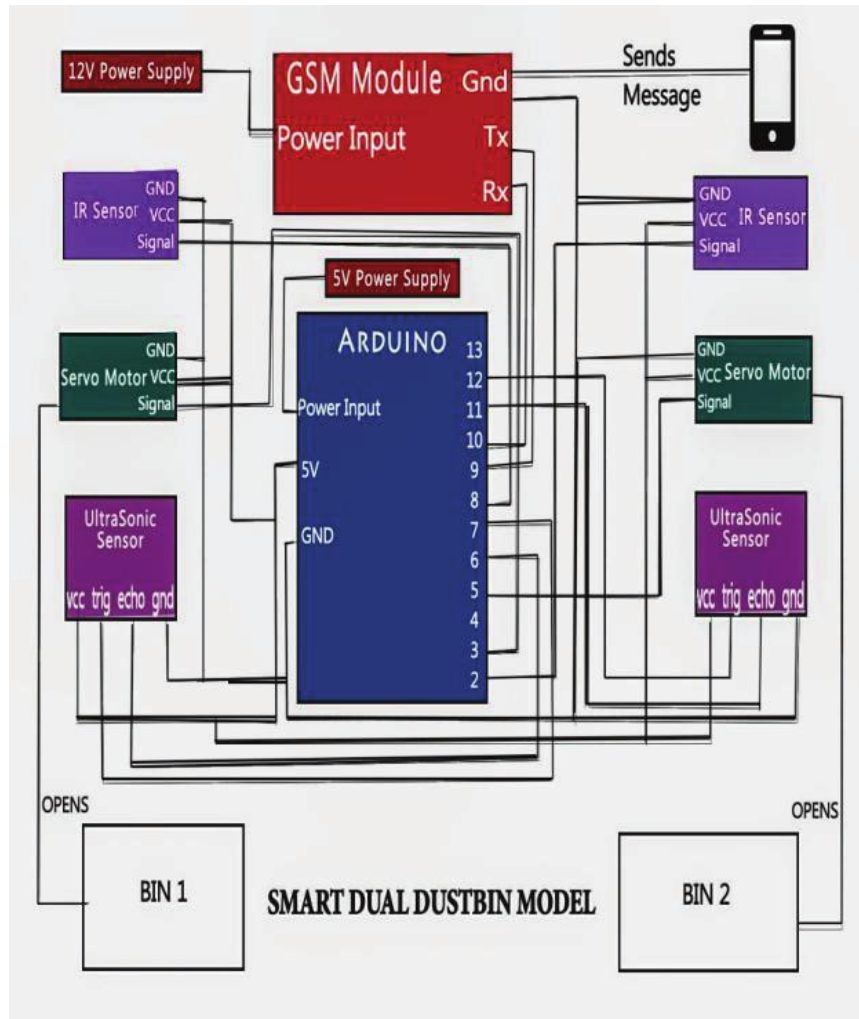


Fig. 1. Block Diagram of Dustbin Model

III. WASTE MANAGEMENT

The trash problem has emerged as one of the major environmental issues in many nations in today's modern world of highly advanced technology and rapidly growing human population. The method of managing garbage collection and management in the nation, where the waste is not managed effectively and efficiently, is the cause of this issue. Wastes are produced from a variety of sources, and these sources have the potential to pollute the environment. The health may potentially be at risk as a result. One of the major challenges for the responsible party in managing the landfill is the lack of appropriate management systems. As a result, site visits and interviews were done in order to learn more about the collection and treatment of waste. It was carried out by the organisation in charge of garbage management[3].

IV. BLOCK DIAGRAM

The block diagram for smart dustbin is represented as

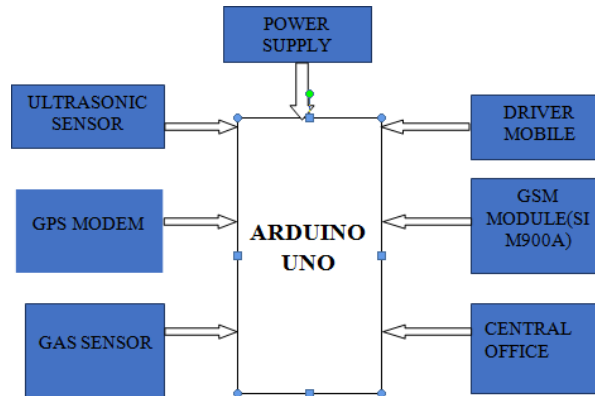


Fig. 2. Diagram of Dustbin Model

V. SOFTWARE DISCRIPTION

ARDUINO IDE

- The open source Arduino IDE programme is mostly used for authoring and compiling code into Arduino Modules.
- The code compilation is so simple thanks to the native Arduino software that even a layperson with no prior technical expertise may get started learning.
- It runs on the Java Platform, which is easily accessible for operating systems like MAC, Windows, and Linux and includes built-in functions and commands that are essential for debugging, modifying, and compiling the code in the environment.
- The languages C and C++ are supported in this context.

Microcontroller

A microcontroller is a tiny computer or a single board of a standalone system comprising peripherals, memory, and a processor. One option is to use it as an embedded framework. In addition, unlike microchips used in computers or other widely applicable applications composed of various separate chips, microcontrollers are designed for installation applications. The majority of programmable microcontrollers used today are embedded in other consumer goods or hardware. The items for the PC system include telephones, peripherals, automobiles, and household items. Microcontrollers then dedicate themselves to a task and put together a specific programme. A programme is kept in read-only memory, or ROM. Devices with limited control are commonly microcontrollers. Furthermore, the parameters bits, packaging type, RAM size, speed, flash size, supply voltage, and the quantity of input and output lines are used to rank microcontrollers[3].

VI. CONCLUSION

The project's goals for developing apps to control Smart Dustbins have been realised. The majority of the pertinent information concerning the general theory of design and implementation has also been introduced throughout this journal paper, specifically in the example at hand. These attempts cover a wide range of technical information, from the theory to the actual implementation of this type of Smart Dustbin employing Apps. In terms of testing and result analysis, the system can function as an observation system, sending reminders and alert notifications to the cleaning department when the ultrasonic sensor determines the amount of trash in the trash can using Blynk Apps. When anyone may use the hardware or the trash can to dump trash in it, the Blynk Apps will be in their online mode. When people place their trash in the trash can, the Blynk Apps collect the data from the trash can. It will send data

starting with the trash can being empty until the trash in the trash can has reached the maximum level where the sensor can identify it. Depending on how much trash is in the trash can, the colour of the LEDs will change accordingly. The technology can then transmit data from one site to another. It has been put to the test over a variety of distances, including 10, 20, and 30 metres up to 100 metres. Data is transmitted between two locations using the Blynk Apps and a Wi-Fi module with varying response times. There are not many differences in how long it takes to respond.

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