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Smart Underground Waste Garbage System

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***Abstract*—The indecorous usage and handling of wastes in municipality, railway stations, airport, and office wastage containers causes many health problems. This paper proposes a cost effective yet robust solution to the problems of disposal of domestic waste in our area utilizing a method that is unique in the sense that while it is simple, the idea is completely novel and easy to untested. In our paper we are going to design two modules one is large smart waste container module and small dummy garbage module. The first main container is placed at underground or below the platform and it can move up and down by simple mechanism. This main waste container designed using ultrasonic sensors, and smell sensors to intimate the filled waste container message to the authority by a voice call using micro controller and GSM module, also we are planned to include compression system to compress the waste to certain limits. This container stores all wastes in underground. The second dummy garbage is placed on roads or platforms for people use and it can move horizontally for waste disposal. It is designed with automatic door system using PIR sensor. This total setup prevents the waste spreads in the public places and its smart waste disposal method is leads to make clean and healthy society in our country. We can install it for any public environment. The proposed scheme has been modeled for robust implementation in the Indian situation.**

***Index Terms*— arduino, PIR sensor, GSM, ultrasonic sensor, driver system.**

I. INTRODUCTION

In our country, there is no awareness about the domestic wastes and handling such waste. Improper handling of domestic wastes create unhygienic environment and also lays platform for the deadly diseases and parasites in the environment. Due to this action people in India suffers from much health related problems and improper disposal of wastes as well as delay disposal of wastes creates bad odor in the surrounding of the waste container. In order to overcome this situation the waste containers have to clean immediately after it fills, so there is a need for controlling the waste container in the smart manner.

This paper proposes a cost effective yet robust solution to the problems of disposal of domestic waste in our area utilizing a method that is unique in the sense that while it is simple, the idea is completely novel and hither to untested. This paper discusses the technical and design aspects in detail and also provides the proposed smart waste container. This paper also reveals the detailed implementation results of this technique utilizing simple components inclusive of a GSM module. The proposed scheme has been modelled for robust implementation in the Indian scenario.

In existing system overall setup is above the platform. It has some disadvantages, the wastes are spread in the area at the time of disposal, cleaners also need to touch the wastes at the time of cleaning, and it produces hazard

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gases and bad smell. It causes deceases to peoples. So in proposed system this all waste handling setup placed under the platform.

In the proposed paper we are going to design two modules one is large smart waste container module and small dummy garbage module. The first main container is placed at underground or below the platform and it can move up and down by simple mechanism. This main waste container designed using ultrasonic sensors, and smell sensors to intimate the filled waste container message to the authority by a voice call using micro controller and GSM module, also we are planned to include compression system to compress the waste to certain limits. This container stores all wastes in underground. The second dummy garbage is placed on roads or platforms for people use and it can move horizontally for waste disposal. It is designed with automatic door system using PIR sensor. This total setup prevents the waste spreads in the public places and its smart waste disposal method is leads to make clean and healthy society in our country. We can install it for any public environment. The proposed scheme has been modelled for robust implementation in the Indian situation.

II. Existing System

In the existing systems they implemented a smarter way of conventional waste management using Ultrasonic sensors to gather fill-level data, presence of garbage around the dustbin and stinking condition from containers and garbage bins, and send it to servers in real time. An authorized phone number which are present in Waste Management centers gather fill-level and other information sent from multiple containers which are situated throughout a city/locality. The data acquired as above, can be used to systematically plan route-map to collect garbage. The information from bins to the authorized number is sent using communicating modules (GSM module).

The entire operation is controlled using Atmega328P 8-bit microcontroller. This report showcases a potential design for an IoT gateway that can be used to provide a framework for a smart waste management system. In the existing system overall setup is above the platform. The existing system has some disadvantages, the wastes are spread in the area at the time of disposal, cleaners also need to touch the wastes at the time of cleaning, and it produces hazard gases and bad smell. It causes deceases to peoples. So in proposed system this all waste handling setup placed under the platform.

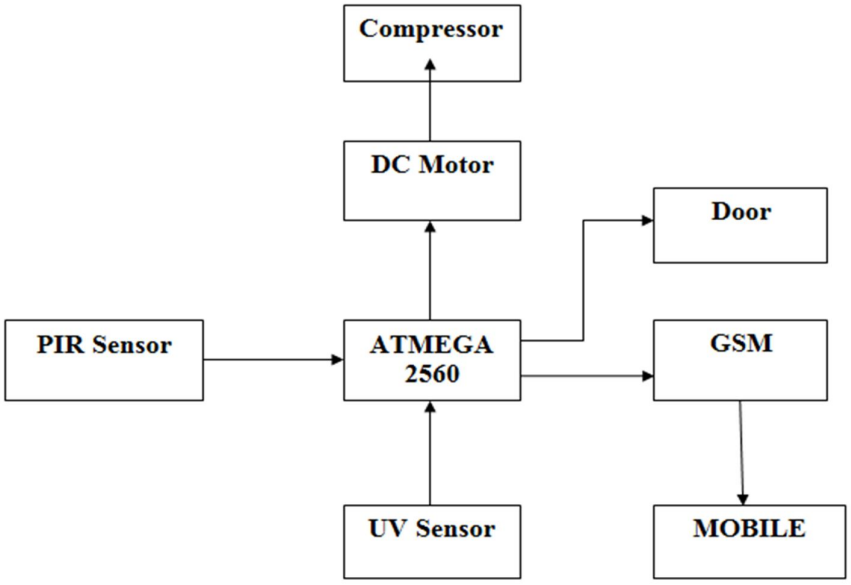

Figure 1. Existing system

III. Proposed System Features

In the proposed system of our paper we are going to design two modules one is large smart waste container module and small dummy garbage module. The first main container is placed at underground or below the

platform and it can move up and down by simple mechanism. This main waste container designed using ultrasonic sensors, and smell sensors to intimate the filled waste container message to the authority by a voice call using micro controller and GSM module, also we are planned to include compression system to compress the waste to certain limits. This container stores all wastes in underground.

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In smart underground waste garbage, arudino is the heart of the system. It controls the all operations and individual components. Here inputs given to the arduino microcontroller from PIR sensors, ultrasonic sensor, which are used to sense the user near the garbage and level of filled in garbage. The output of arduino controller is given to GSM and DC motor of Automatic door system. This total system powered by separate 12V power supply. Arduino and other components used are integrated by using arduino programming like C, C++ coding. Coding for individual components are programmed and finally integrated by loop syntax coding.

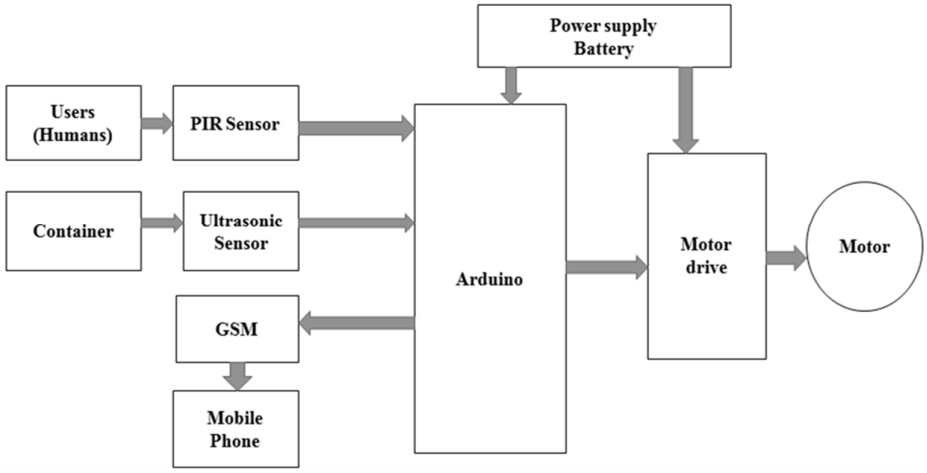

Figure 2. Block diagram of smart underground waste garbage system

A. Automatic door system

This door module is placed in the dummy dustbin module. It is modeled by using DC motor, PIR sensor with arduino controller. When user is near the dustbin the PIR sensor sense and motor rotate clockwise direction and opens the door. After user moved from dustbin door wait for 15 sec and closed automatically.

B. Under ground garbage system

An underground garbage system placed below the platform, in phase with dummy dustbin. It is modeled by using ultrasonic sensor to measure the level of waste filling, GSM to send alert message or voice call to authority, lifting chain setup to lift up the filled garbage and replace the empty garbage below the platform.

Figure 3. PIR sensor

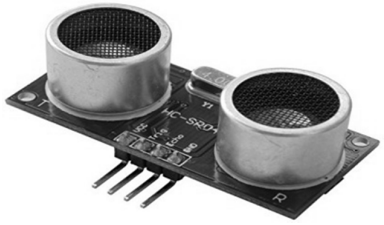

Figure 4. Ultrasonic sensor

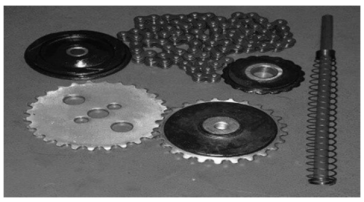

Figure 5. Chain drive setup

Figure 6. Driver circuit

IV. WIRING DIAGRAM

In the proposed system circuit, two terminal of the DC motor are connected to output pin of 3 and 4 of driver circuit. Input terminal are connected to Arduino uno digital pin 2 and 3.Arduino digital pin 8 connected through the PIR sensor output terminal. PIR sensor will give the +5v to VCC terminal and Arduino will give the +5v to Vin. Motor drive circuit to implement to control the forward and reverse direction and consuming +12V power supply.

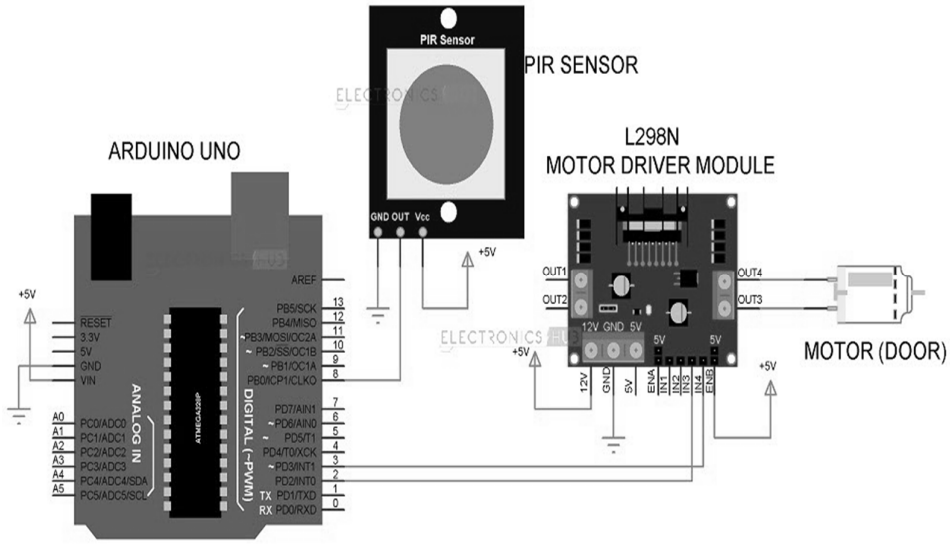

Figure 3. Wiring diagram of smart underground waste garbage system

In this smart garbage system circuit setup, the PIR, ultrasonic sensors, level of waste filling that means signal from ultrasonic sensor and switches for motor driver system are the input segments to the arduino controller. The signal to the door motor, GSM and driver setup are out of arduino controller. These are major signals to control the garbage operation.

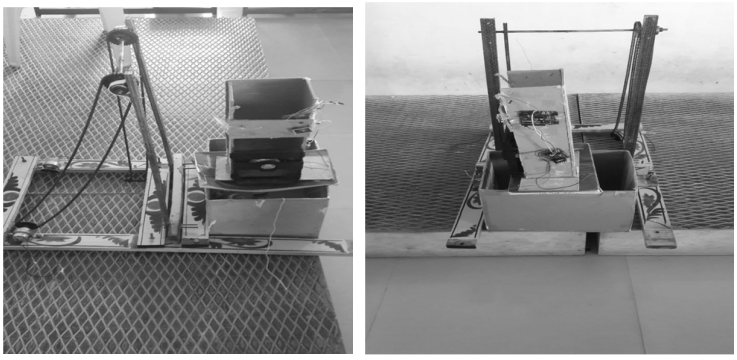

Figure 7. Schematic of the smart underground waste garbage module

V. CONCLUSION

Thus the smart underground waste garbage system is implemented with two modules one is large smart waste container module and small dummy garbage module. The first main container is placed at underground or below the platform and it can move up and down by simple mechanism. This main waste container designed using ultrasonic sensors, and smell sensors to intimate the filled waste container message to the authority by a voice call using micro controller and GSM module, also we are planned to include compression system to compress the waste to certain limits. This container stores all wastes in underground. The second dummy garbage is placed on roads or platforms for people use and it can move horizontally for waste disposal. It is designed with automatic door system using PIR sensor. This total setup prevents the waste spreads in the public places and its smart waste disposal method is leads to make clean and healthy society in our country. We can install it for any public environment. The designed system has been modelled for robust implementation in the Indian situation.

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