

# Smart Garbage Management System Using Gps and Gsm

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**Abstract:** Nowadays world faces lot of problem in waste collection and management. Other main problem in garbage bin is overflow waste, due to this many problems occur to the nearby peoples and also effect the environment. Difficulty arises for finding out the garbage bins whether it is filled or not. The proposed system gives solution to the above stated problem. It will save the time and it also prevents the environment from pollution. This method is used to detect the level of bins automatically and the send data to the cloud and display it using user interface. Ultrasonic sensor is gives data based on the bins level in the garbage. Arduino is used to process the data from it and the NODE MCU is used to send the data to the cloud by interfacing arduino with NODE MCU. GPS is used to find out the exact location of the bin and that information can be send to the truck driver by user interface. With the help of that message, truck driver can identify the location and the status of the bins. This method also has gas sensor to find out the harmful gases from the garbage bin and temperature sensor is used to detect fire in bin that information is passed to nearby fire station using GSM if there is any fire accidents.

**Index Terms:** Automation, GPS, GSM, Ultrasonic Sensor, Temperature sensor, Microcontroller and Node MCU.

## I. INTRODUCTION

Over population in India it leads to increase in waste. India faces major environmental challenges associated with poor waste collection, transport and disposal. Compared to village more wastes are generated in cities and due to this the environment gets polluted and public health is also affected. All the above problems are solved by our proposed system. These systems automatically find-out the bin status and location of the bin and if the bin is fully filled, the truck driver can know the location of it.

Old system need more man power for waste management; by this system we can reduce the man power with the help of embedded system is interfaced with IOT.

Everyday City Corporation sends truck for collecting waste from the city. Truck roam around all places in city for collecting the waste, due to some low populated areas, few bins are not fully filled. This leads to unnecessary waste in time and fuel. By using this embedded based system the bin location with 90% filled capacity can be informed to the driver. This also creates an optimized path to the location of the bin. This system is cost effective compared to old system.

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## II. LITRATURE SURVEY

In this paper, we present the Smart bin system that distinguishes bin status. The framework is intended to store data and to send the information through wireless network. This framework is used to minimize the energy utilization and to operational time. The Smart bin system is tested in open environment [1].

In numerous residential region, the municipal waste containers are always overfull and they are not cleaned at appropriate time. It incorporates flood of waste which results in land contamination, spread of infections, additionally it makes unsanitary conditions for individuals, and brutality to that place. The framework that gives information of the filling of the bin that alarms the city, so that they can clean the bin with out delay. To avoid all situations they motivation is to propose a solution for this problem "Smart Garbage Bin" [2].

In this paper we understand that Garbage cause harm to condition, and it is a peril to plant and human life. To avoid all circumstances they execute a project called IoT Based Smart Garbage. Sensor check garbage fills in dustbin or not and Router gives Wi-Fi to client. The main division of this task relies on the Wi-Fi module, vital for its usage. The fundamental motivation of this project is to development of a smartcity [3].

In this paper objective is the implementation of smart garbage management system utilizing IR sensor, microcontroller and Wi-Fi module. This framework provides the cleaning of dustbins when the waste level reaches its maximum [4].

In this paper, it is essential to understand the societal concerns over the increased rate of resource consumption and waste production and therefore policy makers are encouraged in reusing and reuse methodologies to minimize crude materials and to diminish the amount of waste going to earth [5].

## I. PROPOSED SYSTEM:

In this project the following components are used: ultrasonic sensor, temperature sensor, GSM, GPS, Node MCU and Arduino UNO.

In the Smart garbage management system the ultrasonic sensor is utilized to distinguish the waste level. The bin level can be measured in terms of centimeter. The information from the processor is send to the cloud and the User interfaces like website page and versatile mobile app can show the display level. The area of the filled garbage bin can be recognized by utilizing the GPS and the outcomes are displayed on the user interface.

## II. SYSTEM OVERVIEW:

The garbage bin level and its area can be automated in this project. The proposed framework utilizes ultrasonic sensor to distinguish the garbage bin level and send the information to the cloud. The GPS is utilized to identify the bin location. Temperature sensor is additionally used to identify the flame inside the garbage bin, if any fire accident occurs.

### A. Arduino

. Arduino Uno is a microcontroller, ATmega328P contain in it. It has 14 digital i/o pins and 6 analog input pin, a 16 MHz quartz crystal, a USB connection, a power jack and a reset button. Simply connect to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. Embedded C program is used for coding.

### B. Temperature Sensor

The temperature in the garbage bin can be measured by using the temperature sensor. The message is send to the nearby fire station if it reaches the critical level of temperature.

### C. GPS

GPS is a tracking device that is used to track the precise location. With the help of the satellite the location can be finding by using GPS. It gives exact latitude and longitude of the garbage bin location.

### D. GSM

Global System for Mobile communication has been used in this system for the case if any fire accident has detected. The purpose of GSM in this system is to alert nearby fire station through SMS that some accident has detected and send exact location.

### E. Ultrasonic sensor and Gas Sensor

Ultrasonic sensor is used to measure the level of bin. Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to 3mm. MQ-135 can be used to detect the different types of gases present around the air. It has fast response and high sensitivity. To detect the harmful gases inside the garbage bin this sensor is used.

## III. BLOCK DIAGRAM

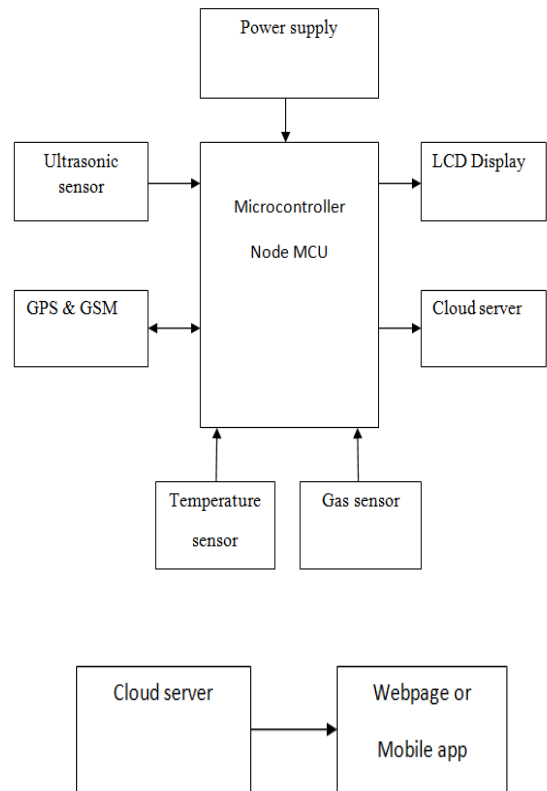


Fig. 1: Block Diagram

GPS – Global Positioning System

LCD – Liquid Crystal Display

GSM – Global System for Mobile communication

## IV . SYSTEM ARCHITECTURE

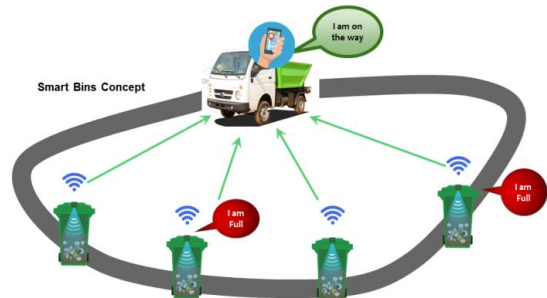


Fig. 2: System Architecture

Proposed system is used for waste management system and is based on collection of waste in city for healthy environment. Bin status can be found out with the help of ultrasonic sensor and embedded processor. That information is send to truck driver using GSM or mobile application and the GPS detects the location of bin and the bin location can be shared with the truck driver.

V.FLOW CHART:

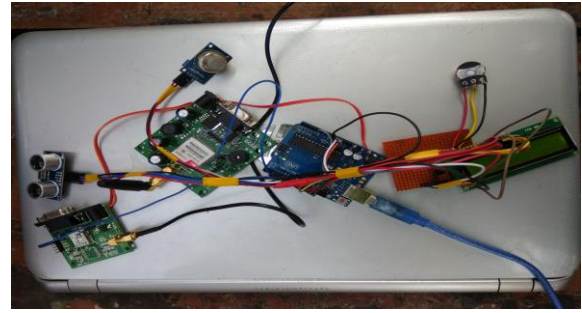
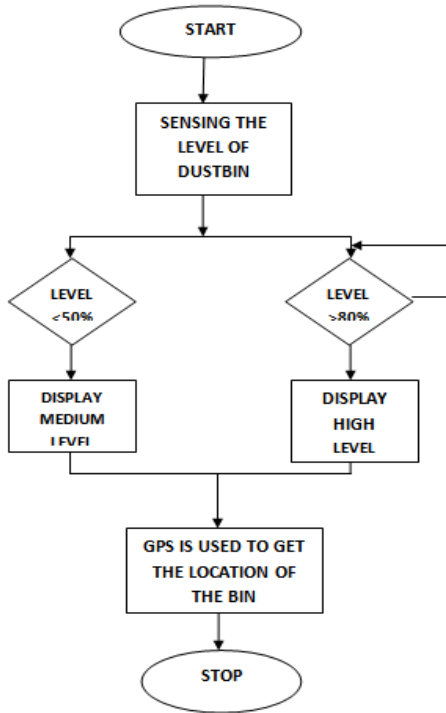


Fig. 4: Hardware implementation

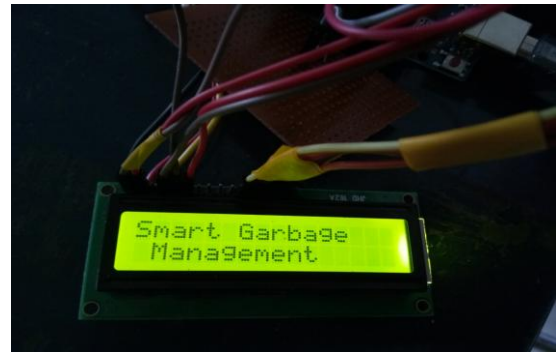


Fig. 5: Initial message display in LCD

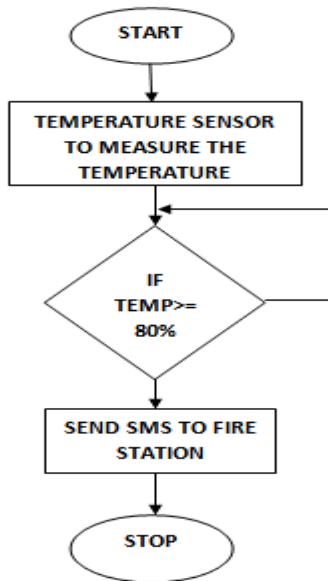


Fig. 6: Message sending via GSM

FIG 3: FLOWCHART OF THE SYSTEM

VI. EXPERIMENTAL RESULTS:

The proposed system is practically tested and results are shown below;

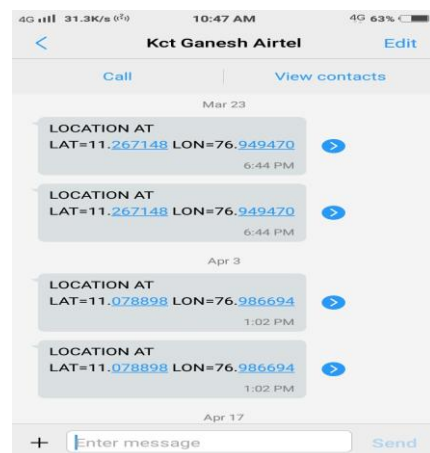
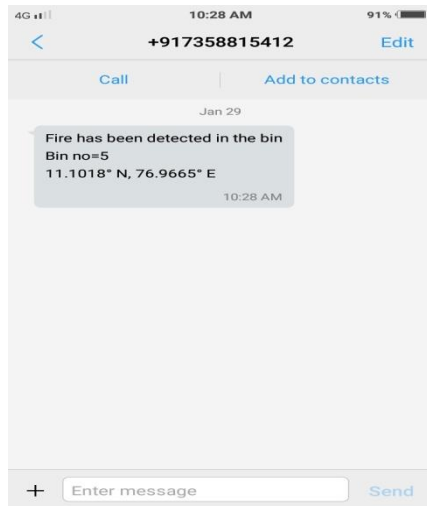


Fig. 7: Bin status



**Fig. 8: Fire Notification**



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## VI. CONCLUSION

Corporations all over the nation and in states faces major problem in waste collection by using the current systems. Introducing automation and embedded system to waste collection methodology moves the current systems to next level. The waste collected in the bin directly disturbs the environment and also affects the people's fitness. To overcome this problem, this proposed system provides a practical solution to help waste management system. This project is helpful for the nation's "CLEAN INDIA MISION". This project reduces the man power and also increases the efficacy of waste collection.

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