SMART GARBAGE MANAGMENT SYSTEM USING GPS AND GSM

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Abstract

The design is aimed to give the current situation's diurnal population growth, the ecosystem should be tidy and aseptic. utmost metropolises' overflowing trash barrels lead to an sick atmosphere. This will also contribute to the emergence of several unidentified conditions. Due to this lower the position of living. This paper provides a detailed illustration of an IOT-grounded scrap monitoring system to maintain a clean and safe terrain in order to help similar occurrences .Based on waste monitoring system to maintain a clean and secure terrain.

1. Introduction

As a result of urbanisation, many areas in significant towns and cities are today extremely inhabited, and numerous apartments and flats have been constructed to house those people. The government has built dwellings or houses within the region condominiums to shelter people due to the increasing cost of housing mandates as a result of migration from villages to towns in pursuit of a job [1]. There are several issues facing communities as a result of the rapid population growth in large cities. Inadequate trash removal in highly populated areas is one of the most critical issues. An vast population's accumulation of waste gives rise to this issue, and poor garbage disposal leads to illness or even has a detrimental impact on social connections. If the condition of the bins is periodically checked, trash disposal may be managed more effectively and efficiently [2].

The municipality has the power to be notified when the trash can is full or nearly full in addition to the waste level, enabling dynamic routing and planning. Distinct from routine and static scheduling is waste collection. Unsuitable garbage disposal in highly populated places is one of these major issues [3]. Due to the large population and improper disposal of accumulated wastes, this problem arises, which can lead to infection or even harm interpersonal relationships [4]. Trash disposal can be managed more efficiently and effectively by routinely checking the identification of the containers.

Along with being able to be informed of the amount of trash, the municipality also has the right to be informed when the trash can is finished or on its way to being finished, facilitating dynamic routing and scheduling [5].

II.LITERATURE SURVEY

IOT smart scrap monitoring using android and real time database [6]

The implementation of IoT-based smart waste systems using ultrasonic sensors on internet networks is the primary topic of this study. The sensory component of the monitoring system was able to track the height level of garbage volume and display it on a map of the area.

Smart Garbage Monitoring System using the Internet of Effects [7]

The amount of trash in this paper is determined using an ultrasonic sensor. When an IR sensor detects nearby persons, the DC motor is quickly turned on to open the garbage lid. IoT allows for the transfer

of dustbin data to the cloud, which facilitates the removal of trash from the bin. The app is registered with the user's name and password when they launch it.

Smart Garbage Monitoring System for Waste Management [8]
The proposed system consists of an ultrasonic sensor for gauging trash levels, a GSM module for SMS transmission, and an Arduino Uno for system management. In order for the rubbish to be picked up right away, the trash can is expected to generate and transmit SMS warning messages to the municipality when it is full or nearly full

PROBLEM STATEMENT
To reduce the costs of clearing the waste bins and the staff that is currently involved in this operation, it is necessary to manage all of the trash cans that are scattered across the city in an efficient manner. It is possible to achieve this by fusing cloud computing, IoT, and machine learning in order to give truck drivers a roadmap that shows the fastest and most efficient method to take and collect trash bins in order to conserve time and fuel. This project aids in the success of the important "SWACHH BHARAT ABHIYAN" effort of the Indian government. Various technologies will be used to build and implement smart cities, and this project will be beneficial. By continuously monitoring the level of solid waste present in the garbage bins, the pertinent information is sent to the responsible authorities to collect the solid waste that has collected in the bins.

LIMITATIONS OF EXISTING METHOD
- The system will need more trash cans for separate garbage collection as the city's population rises. Smart trash cans have a higher initial cost than alternative methods due to this.
- The sensor nodes used in the dustbins have a limited amount of memory.
- Dustbin sensors and nodes have a finite amount of memory.
- Zigbee and wifi, two of the system's wireless technologies, have a constrained range and data speed. Metal objects in RFID-based systems (if any) affect RFID tags.
- Low-skilled workers see a rise in unemployment as a result of the decreased demand for labour.
- Training is required for those taking part in the smart waste management system.

III. SYSTEM ANALYSIS
BLOCK DIAGRAM DETAIILS
.It is built with an ultrasonic sensor that measures the volume of trash in each trash can. The controller of the system, node MCU, receives the data from the ultrasonic sensor after that. Municipal officials receive an alert when garbage cans are almost full, telling them to gather the solid waste and place it in the cans. The communication received by the municipal authorities includes a text message as well as a link to the location of the trash can on a google map. Residents can learn about the level of each trash can thanks to the presence of an LED at each one
The below figure 1 shows the block diagram of smart garbage management system.Here arduino board, GSM modem operates with 12V DC, LCD display, sensor circuit operates with DC 5V supply and this supply is provided by regulator of LM7805. 12V step down transformer with rectifier and filter is used to give power supply.
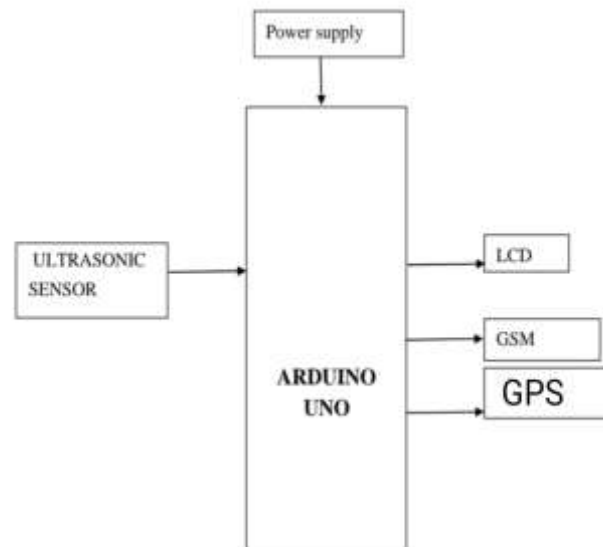
Fig.1 BLOCK DIAGRAM

HARDWARE REQUIREMENTS

The main components of the project are:

a) Arduino UNO
b) LCD
c) Ultrasonic Sensor
d) GPS
e) Regulated Power Supply
f) Jumper wires
g) GSM

SOFTWARE REQUIREMNTS

This project is implemented using following software's:

a) Arduino IDE

The below figure 2 shows the Arduino IDE. After installing the Arduino IDE on your computer and set up the board so that it is ready to accept programmes via USB cable

Fig.2 Arduino IDE

FLOW CHART DETAILS

Ultrasonic sensors can measure the height of rubbish building up in garbage cans or the level of bin .In this project, we've chosen that the trash can will send a message with the link to the bin's location to the municipal authorities once its threshold value hits 90%. For those who live nearby and utilise the bin, a sign indicating its level is placed close by at ground level. When the project is significantly expanded, it is impossible to pinpoint the precise position of the bin from which the message is received, even if each bin is given a code. To fix this, we sent a text message including a link to the garbage can's current location using a GPS module. The central unit node MCU oversees the entire operation.

The below figure 3 shows the block diagram of smart garbage management system.The working principle depicted by the block diagram in figure-1. It is built with an ultrasonic sensor that measures the volume of trash in each trash can.
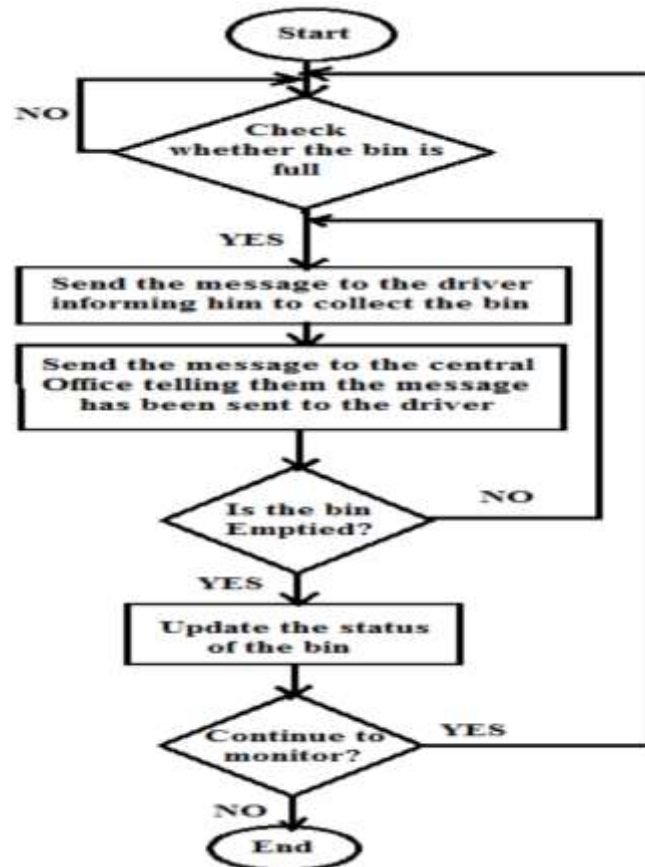

Fig.3 FLOW CHART

WORKING PRINCIPLE

The ultrasonic sensor, which is installed on top of the bin and counts the amount of trash there, is triggered by the Arduino Mega 2560. When the garbage level in the bin reaches the threshold value, the sensor alerts the Arduino Mega, which then activates the GSM Module and the GPS Modem. The GPS modem logs the bin's location and transmits it to the GSM module. The GSM Module then combines the message with the coordinates for the bin's position. This combination has now been communicated to the truck driver (the trash collector). The Central Office is thereafter informed in a second communication that the collector has been notified.

The trash can is secured to the mobile equipment. The dustbin determines the quantity of rubbish waste. The GPS-enabled alert device tells the local authorities when the waste level is full. The provided GPS information helps the municipal truck driver find the location. The portable hardware element and buzzer on our dustbin set it apart from competing products. Due to the ease with which any kind of trash can may be added to and removed from the portable hardware component. The IOT-based Smart Garbage Monitoring System is effective and helps the neighborhood keep the city clean.

CONCLUSION

The goal of the initiative was to enhance waste management within the company. Before creating the project, the technical factors and constraints associated to it were examined. The project's extensive implementation will result in a significant decrease in the Waste Management System's service costs. It is advised to install surveillance cameras to watch for improper rubbish bin utilisation. Data security and device security can be implemented at the edge level to improve the project in the future. Decision-making can also be done using the stored sensor data.

A message with a GPS location can be sent to the local authorities using the suggested AI system in conjunction with IOT. Dustbin levels are monitored using ultrasonic sensors. The suggested technology can now be utilised in a few limited places, but after it passes its reliability test, it can be used in all significant areas. Future smart waste system management and maintenance could be handled by a dedicated crew that would be in charge of overseeing and maintaining the system. Effective waste management is a significant issue and a barrier to hygiene everywhere in the world. In most parts of the city, new technologies and advancements have been used to offer better solutions to dispose of trash.

FUTURE SCOPE

Future improvements to our study project are possible as well. We can use two trash cans, one for dry trash and the other for wet trash, to separate the two sorts of waste. Wet trash can be further broken down and used to create biogas. Additionally, all of the parts and the control unit can be embedded and placed in the bin. We can improve the GUI-based user interface to make it simpler to use for laypeople.

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