Smart garbage collecting and monitoring system using GSM and GPS

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ABSTRACT

In today’s world due to the industrial revolution and increase in the population a lot of waste is produced every day. But due to mismanagement and improper monitoring, we can see overflowing and overloaded dustbins in our surrounding. At many places, the trucks don’t even visit regularly. This leads to unhygienic conditions as well as provokes various dangerous diseases. So by keeping all this in mind, we have proposed a ‘smart garbage collecting system’ in this paper wherein we have fused the human efforts of personally monitoring the bins with IOT. The level of bin filled would be detected with the help of ultrasonic sensor and would be communicated to the centralized system using GSM. The interfacing of sensor and GSM is done with the help of microcontroller. Also to do the real-time tracking of truck one GSM and GPS will be placed on the truck and the exact location of the truck, as well as the bin, can be identified with the help of GUI which would be sent to the centralized system.

Keywords— GSM, GPS, Ultrasonic sensor, Microcontroller

1. INTRODUCTION

In today’s era due to overgrowing population, waste management has become one of the major concerns all over the world. The overflowing garbage not just leads to an unpleasant and eyesoric environment but also leads to various health issues. Various bacterias and vermis breed on garbage. For a collection of wastes, the government spent a lot of money and gives the contract to private sectors for collection of this garbage. But they don’t do their work properly as a result of which we find overflowing bins and at many places, the trucks don’t even visit regularly. So in this paper, we have presented a system to manage this stuff i.e to keep an eye on the level of bins and simultaneously track the truck’s location to ensure that it is visiting all the places and doing it’s work properly.

2. LITERATURE SURVEY

The method proposed by Ousmane Abdoulaye Oumar [1] is based on GPS tracking system to track the location of a truck and its speed based on a mobile phone text messaging system.

The system proposed by Md. Abdulla Al Mamun [2] mainly studies a new framework that enables the remote monitoring of solid waste bin in real time, via ZigBee-PRO and GPRS, to assist the solid waste management process. The system is designed to monitor the status of the bin as soon as someone throws waste insight it. The system framework is based on a wireless sensor network, contains three levels: smart bin, gateway and control station that stores and analyze the data for further use. In this way, the waste collection route can be optimized by feeding the collected data into a decision support system and hence able to reduce operating costs and emissions.

The paper presented by Abhay Shankar Bharadwaj [3] focuses on the collection of data from bins and send them to a gateway using LoRa technology. The data from various garbage bins are collected by the gateway and sent to the cloud over the Internet using the MQTT (Message Queue Telemetry Transport) protocol. The main advantage of the proposed system is the use of Lora technology for data communication which enables long-distance data transmission along with low power consumption as compared to Wi-Fi, Bluetooth or Zigbee.

In his paper, S. Balamurugan [4] has proposed a low cost, low power waste management system which will be applicable in regions which are not economically sound. This system enables us to collect the trash as and when the can is full or when the trash inside is decomposed compared to the daily collection. This has been designed using an Arduino Uno board incorporating additional modules such as a GSM module to send messages.

The system proposed by Ujwala Ravale [5] also focuses on detecting the level of bin filled by using two IR sensors, Arduino Uno and Raspberry pie. Out of the two ultrasonic one,
IR sensor will detect 50% garbage collected in the dustbin and second IR sensor will detect 100% garbage collected in the dustbin. The output of the IR sensor is given to Arduino Uno board which act as the system controller. The status of the bin is informed to the municipal control unit through the Raspberry pie.

3. OBJECTIVE
The main aim of this paper is to control the overflowing of garbage bins. We will achieve our target by sending the information of the bin’s level to the centralized system and by tracking truck’s location by using IOT and a GUI will also be sent to the central system to have a real-time tracking.

4. PROCESS FLOW
Our idea in this paper is divided into two parts. One part deals with analyzing the bin’s level by using the ultrasonic sensor. In the programming, we have set the level of 12cm. So when the garbage bin up to the level of 12 cm from the top, it will wait for 45 seconds to ensure that it is garbage and not anyone’s hand in between and then GSM module 900 will send a message to the centralized system that the bin no. at this particular location is full so please send the truck and collect it. The interfacing of the ultrasonic sensor and GSM is done with the help of Arduino.

Another part deals with the tracking of the truck. It includes GSM, GPS and Arduino for interfacing. To have real-time tracking, the GSM will send the location of the truck, which will identify by the GPS, to the centralized system at the gap of every 30 seconds. The LCD on the Arduino will show the location in terms of latitude and longitude and message which will be sent to the centralized system contains a link by clicking on which our the actual location of the truck will be shown on google map. Here we are using a 16x2 LCD intelligent LCD display which has backlight LED. Thus we can do the real-time tracking of the truck and also check whether it is following the right path or not.

5. SYSTEM OVERVIEW
In this paper, we have proposed a system which can detect the level of bins and at the same time can do real-time tracking of the truck. One part of the project deals with the bin level detection which will send the message to the centralized system once the bill is filled up to 90% and will ask them to send a truck and collect it.

The other part deals with the tracking of the truck to ensure that it is following the proper route and doing its work properly. The GPS installed on the truck will detect its position and with the help of GSM the message will be sent at a gap of every 30 seconds.

6. CONCLUSION
In this paper, we have presented a garbage monitoring and truck tracking system by using which we would successfully be able to control the flowing of garbage bins and send the complete data to the central system. This system can be installed in buildings, companies and various other public places to ensure the cleanliness of the environment.

7. REFERENCES