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SMART WASTE MANAGEMENT SYSTEM

Chaitra U R, Avila Priya Pinto, Preetha D Souza

Assistant Professor, Dept. of ECE, St Joseph Engineering College, Mangaluru, Karnataka, India

ABSTRACT: Waste management is major global issue. Developed and underdeveloped countries around world spending huge amount of money for the waste management. Several public awareness programmes have been conducted to spread the awareness of the Importance of waste management. Several efforts done by the government goes in vain due to irresponsible behaviour by the public, which in turn cause major health issues such as Dengue, malaria etc. In order to improve waste management system, we need to adopt modern way and need to avoid conventional method. Advancement in technology has improved human life in many aspects. By implementing IOT we can improve waste management system by deploying smart bins across the city which helps to differentiate between wet and dry waste. Also helps the municipal to keep the track of various factors related to waste such as amount of waste generated from each apartment or housing society, types of wastes. All those relevant information is stored in data base which will help the municipal management to improve the waste management. with help of machine learning one can predict filling level of the container and notify the management.

KEYWORDS: Sensor, GSM Module, GPS

I. INTRODUCTION

Waste management is one of the major issue humans are facing. As media reportIndia reportedly spends 62,000 crores annually under swatch Bharat scheme, which requires lot of time and man power. Though India is still facing waste management issue after spending good amount of money and time. Most of the population in the country leave in unhygienic environment and get affected by the hazardous diseases.

As the industrialization was evolved the people shifted to cities for the employment and for better opportunities, which resulted imbalance in population i.e., is peoples from different part of country settled in the capital and commercial city leaving their home town and village. As the urbanization increased waste accumulation also increased drastically as cities become more crowded. As per media report's Bengaluru alone produces 6,000 tonnes of waste in a single day due to urbanization. The idea of municipal commission came into existence in the 18th century.

II. METHODOLOGY

ROLE OF MACHINE LEARNING

The sensors used in the system are a customized hardware solution. The ultrasonic sensor measures a filling levelof a recycling container regularly throughout the day at a configurable interval. The accelerometer continuously measures the acceleration of the corresponding container. If the acceleration exceeds a configurable threshold the sensor wakes the main processor with an interrupt.

The collected data is analysed for the prediction, supervised learning algorithm has been approached were collected is labelled as per their attributes i.e., is waste in the Container. As the level increases in the container data is stored in ESP 8266 latter in the database, the stored data is analysed for prediction and gives the output in the form of date and time of filling level of container.

ROLE OF IOT:

Internet of Things (IoT) is one of the fastest-growing technologies of the present world. In the proposed topic all the relevant data is stored in the cloud. here the data such as filling level, date and time, all are collected accordingly and analysed. The analysed data is processed for the prediction of filling level so that municipal Staff can collect the waste from the particular ward.

FUNCTIONING OF HARDWARE: ULTRASONIC SENSOR:

Sensor emits ultrasonic waves from transmission end to evaluate the attributes of the Object. The emitted wave hits the object, the wave is reflected back from the object. Here the distance matters the most, the distance between the sensor and the object is about ceiling and level of filling. The trigger pin triggers the echo pin for transmission of the wave,

the VCC value should be 5v in order to trigger the sensor. The range of target is determined by the time lagging between transmitted pulse and received echo.

ESP 8266:

It is a microchip basically microcontroller operates on local Wi-Fi source. It is employed to get the GPS location of the container so one could track it. It contains an indicator that let us know the whether it is connected to the GPS. It takes approximately 10 min. Time for the connection. GPS co- ordinate is saved in the database along with the filling Level of dustbin. GPS gives the information about co- ordinates, date and time.

ROLE OF CLOUD SERVER:

The sensor data from the bins are sent to the cloud server. The transmitted data can be analyzed and represented in the most convenient way for an efficient waste collection system. The traditional waste collection system doesn't depend on the real-time data from the bins. The collection system can wholly depend on the analysis of the monitored data to set the time and route for waste collecting reduces human labour but also decreasesthe fuel cost and maintenance cost by a great percentage.

III. PROPOSED ALGORITHM
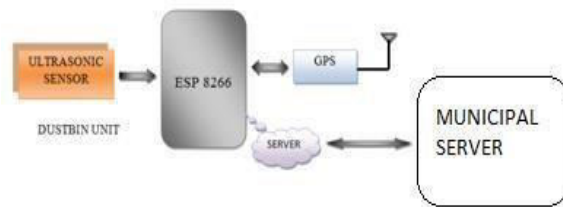
Ultrasonic sensor mounted on the top of the container or on the bin to measure the level of the waste. Sensor emits the sound wave and with the help of emitted wave sensor evaluate the attributes of the object, wave reflected back to the sensor. the received data is stored in the form of pulse or edges. ESP 8266 collects fill level data and it is operated through local Wi-Fi source, there will be led to indicate the ESP module is connected to GPS and ready to share the GPS co-ordination of the container with the help of Omni directional antenna.

Omni directional antenna and ESP 8266 is connected to the GPS receiver, Omni directional antenna fetches the GPS connection in all the direction at the same time GPS receiver receives and process the co-ordinate fed through the antenna.

FUNCTIONING OF SOFTWARE:

PHP (HYPERTEXT PROCESSOR):

Basically, PHP is used to build the server and fetch the data from hardware and collected data is stored in the data base. Longitude, latitude and dustbin level are some of the data need to be stored and to be updated in the application. It receives the information from hardware i.e., is from ESP 8266 module process the data and store in database. User phone numbers are stored so that user get real time GPS locations are updated.

JSON   (JAVASCRIPT   OBJECT NOTATION):

JSON is used to exchange the data between server and application. Data such as registered phone number of people is stored in the PHP server. In order to connect to the server and update the information of registered phone numbers, the registered phone number get the information about location in an application. In order to process the information and perform the task java script has written where it performs the task such as exchange of longitude and latitude information to the server.

JAVA:

JAVA is used to build an application from flesh page to user interface and process the collected data in an application from hardware. Basically it is object oriented programming language for an back end development.

XML:

XML is markup language used for development of an application. For structuring the data by identifying and organize it accordingly.

IV. **RESULTS**

This smart bin provides GPS location of both dustbin user and vehicle users (municipal driver) through android app. We can also check the levels of dustbin through ultrasonic sensors which intimate the levels through percentage in android app. The result obtained is shown in figure below in fig 1. It shows the filling level of dustbin.

Figure 1 Dustbin with empty and filled levels

Fig 2 is the vehicle model which is connected to Omni directional antenna and Fig 3 is dustbin model in which ultrasonic sensor is employed which is connected to Wi-Fi model. Fig 1 shows the output it indicates the filling level of dustbin, as the filling level increases in the dustbin it will be indicated in the application. The data fetched from hardware part will be updated on the application with the help of PHP and JSON programming language. In the application co-ordinates are also updated i.e. is longitude and latitude. To obtain accurate GPS location improvement in coding is needed.

Figure 2 Vehicle model

Figure 3 Dustbin model

Next step is to improvise the code by fixing the bugs in order to improve the accuracy of the co-ordinates. In the application basically there are interfaces User interface and Driver interface, in both interface longitude and latitude is updated. As shown in F ig 4 it shows user interface which indicates the location of the vehicle and in Fig 5 indicates the driver interface were dustbin level and its location, Dustbin level is indicated in the percentage form.
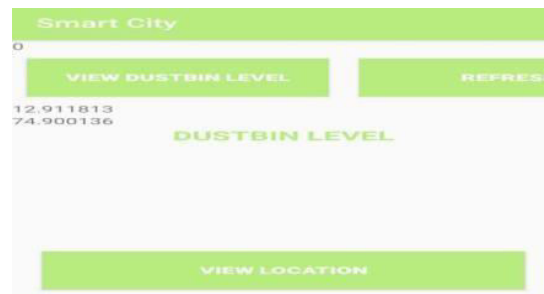

Figure 4 User interface

Figure 5 Driver interface

V. CONCLUSION AND FUTURE WORK

   Basic idea of our application is to provide ease to software project management. Our application works on Android, a phone that adds the mobility feature. The user can access the data from anywhere anytime through the mobile phone. It can also estimate the cost of the project. It provides the facility to analyse and control the execution of project. Alerts are automatically sent to the users for the update in data.

   Change the system of user's authentication and atomic lock of bins which would help in securing the bin from any type of damage or theft. Improving graphical interface for the server and complete android applications has possibility of extending the system adding other use cases and application for smart city. Optimal routing can be implemented.

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