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Survey on Smart Garbage Collection System Using IOT

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ABSTRACT:Waste Management may defined as the discipline associated with the control of generation, collection , storage ,transfer and transport ,processing and disposal of waste accord with the best principle of public health .Nowadays the Dustbins placed in public are get overflow due to increase in waste in cities .Due to the lack of resource the municipal corporation does not get information about overflow dustbins .This may lead to unhygienic condition in cities and cause health hazard .The IOT may the solution for this problem .The Internet of Things (IOT) is the network of physical devices embedded with software and sensors and network connectivity which is enables these objects to collect and exchange data .We can develop Smart Garbage Collector System Using IOT .The main purpose of this system is to develop the system which uses the information collected from sensors to manage the collected garbage. In proposed system the each Smart Bin(Dustbin) which are located in several areas of city are connected to internet wirelessly, they equipped with sensors which collects the data about level of collected garbage in Smart Bin and location of Smart Bin .Then Smart Bin send this information to central web portal using GSM module. If the Smart Bin is filled up to its threshold value then the message is displayed on web portal and the responsible authority take proper action and it will shows the all information on to the Smart Bin Application on the users mobile phone .The Smart Bin Application will show the possible shortest path till the nearest Smart Bin to the user.

KEYWORDS: Internet Of Things (IOT), Smart Garbage Collector System, Smart Bin, Arduino Uno microcontroller, GSM module, Ultrasonic Sensor, Wi-Fi Module.

I. INTRODUCTION

To days municipal waste management system is not effective and it is not able to maintain hygienic standards as well. Due to the ignorance the cities remains unhygienic and due to this the many health issues are ariseFor efficient waste management there is need of information about conditions of all Dust Bins in cities. So the municipal authority take proper action according to condition of dust bin and the further waste management process will be get accelerated. The main aim of proposed system is to generate the real time report for each Dust Bin. In proposed system each Dust Bin (Smart Bin) is contain Arduino microcontroller, Ultrasonic Sensor, ESP 8266 Wi-Fi Module and GPRS module. Each Smart Bin is placed in different area of city. Each Smart bin have Unique ID which is its location co-ordinates that are obtained from GPRS module. Each Smart Bin can sense the level of garbage in it and send this level to the central web site. There is a threshold value of level of garbage for each smart bin if the current level of garbage is greater than threshold value then then Smart Bin sends the alert message to the web site. The web site will contain the information of all the Smart Bin in city i.e. location and level of collected garbage. The municipal authority can send the signal of cleaning of Smart Bin to the workers. Web site is connected to the android application. The application will show the all nearby Smart Bin to the user. It will also show the path towards nearest Smart Bin along will distance and the level of that smart Bin.

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II. LITERATURE SURVEY

In paper [1] author provides the solution for dry and wet waste and also provide the information of arrival time of cleaning vehicle. In paper [2] author provides solution for overflowed dust bins when dust bins are filled above threshold limit they sends the information to authority. In paper [3] system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a web page. For this the system uses ultrasonic sensors to detect the garbage level. Smart bin is built on an Arduino Uno board which is interfaced with GSM modem and Ultrasonic sensor. In [4] the system contains four IR sensor fitted on upper rim of a dustbin. IR sensors are connected to a Raspberry Pi 2 board. The board equipped with a Wi-Fi Module and GSM Module which is connected to the Internet. When the dustbin gets filled, it alerts the system. The system is Web Application that handles all notifications from the bins and puts up their locations on a map. The system then schedules the collection plan and provides a shorted route for collection of garbage in bins to the worker. In [5] system will detect the level of waste in dust bin and send the information to the truck driver through SMS using GPRS module optimization function will not use that node.

III. PROPOSED SYSTEM

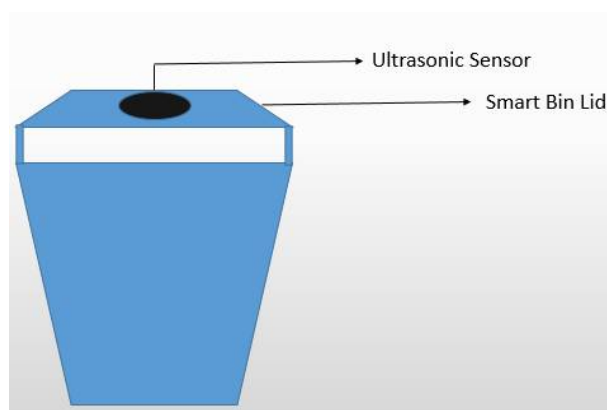


Figure 2 .Position of Ultrasonic Sensor in Smart Bin

A. *Design:* The Proposed System Will Contain Smart Bin, Web Server and Android Application .Each Smart Bin contain arduino board, ultrasonic sensor, Wi-Fi module, GPRS module. Ultrasonic sensor is placed on top of Smart Bin so it will detect the level of waste in Smart Bin correctly. The arduino board is attached with the Wi-Fi module and the GPRS module. The GPRS module is used to get the location of Smart Bin. The Wi-Fi module is used to send the level of garbage and the location of smart bin to the central web server. Then the android application is show all the Smart Bin in nearby area. It will also show the path till nearest Smart Bin with its distance and level.

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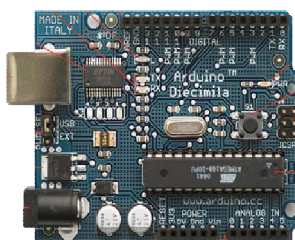
Figure 3. Smart Bin Android Application

For getting location of smart bin we use GPRS module. Using this we can get tower information and triangulate the latitude and longitude to get actual geographical co-ordinates.

B. Components :

1. Arduino Board
2. Ultrasonic Sensor
3. ESP 8266 (Wi-Fi Module)
4. Sim 900a (GPRS Module)

1. Arduino Board:



It is open source single board micro controller. It includes serial interface with USB. It is a low cost device used to interact with environment using sensors and actuators. Used for controlling all the operations of attached module.

2. Ultrasonic Sensor



The sensor emits ultrasonic waves and receives the reflected back from target. It measures the distance to the target by measuring the time between the emission and reception. Range is 3 cm to 3 m. It operates on 3.3 VDC power.

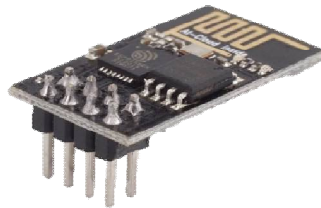
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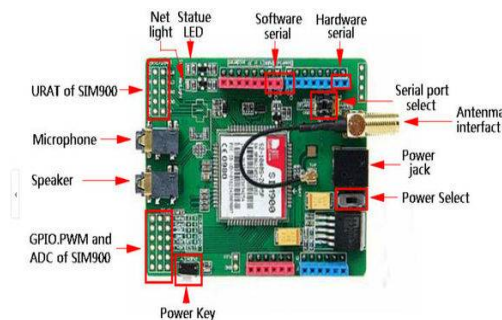
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3. ESP 8266



It is low cost Wi-Fi chip full with TCP/IP stack and microcontroller unit. It has 16 GPIO input pins. It require 3.3 VDC input to operates.

4. Sim 900a



Work like mobile phone, It requires Sim card for operation .It delivers GSM/GPRS 900/1800 MHz performance for voice, SMS, Data with the low power consumption. Operates in dual band 900/1800 MHz
It is used to get location of Smart Bin. It has supply voltage range 3.2 v to 4.2 v.

IV. ACKNOWLEDGEMENT

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V. CONCLUSION

Here we provided system which is effective than current system. Proposed system is easy to use. It utilize the available resources efficiently and achieve higher hygiene standards. Proposed System will provide the access of information to the public as well which make process transparent.

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