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Smart garbage monitoring system using IoT

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ABSTRACT

A big challenge is urban cities is garbage collection process. The garbage collecting authority or the municipal corporation peoples in traditional waste management system doesn't know about the level of garbage in dustbin, if the dust bins gets full by garbage then it gets overflowed as well as spelled out from the dustbin leading to unhygienic condition in cities. Even if the dust bin is overloaded by garbage peoples throws the garbage on that dustbin. Because of that overflowed dustbin and the spelled garbage bad smell arises also it leads to unhygienic conditions in many cities. Sometimes due to unclean dustbins some toxic gases may produce and which will support to the air pollution. Also some harmful diseases may spread. It is very bad look of city. Due to which unhygienic condition occurs. Use of Use of traditional system result in inefficient and time and money spending system. So the concept of Smart Garbage Monitoring System is implemented in cities. Where the rate of production of garbage or waste is high but efforts put to control the garbage management are vey less. In order to overcome this many issues stated above smart garbage monitoring system using IoT will help.

Keywords: *GPS, Ultrasonic sensor, LED, MQ-6 Gas sensor, Arduino ,NodeMCU.*

1. INTRODUCTION

IoT or Internet Things refers to the network of connected physical objects or "Things" embedded with electronics, software, sensors and network connectivity which enables these objects to collect or exchange data. IoT allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration between the physical world and computer-based systems, and resulting in improved efficiency, accuracy, and economic benefit. Since then the scope of IoT has grown tremendously as currently it consists of more than 12 billion connected devices and according to the experts it will increase to 50 billion by the end of 2020.

As human population is increasing tremendously, as the population is increasing the rate of production of garbage or the waste is also increasing rapidly. This tremendous increase in garbage production threatens standards of hygiene at micro and macro levels. The improper disposal of waste imperil the health of human and animal residents in towns, cities and entire nations. The garbage in the dustbins may contain organic matter, such as food particles, it frequently attracts scavenger animals. These animals finds for food in dustbins, scattering trash and spread of bacteria and pathogens in the process. Such improper management of garbage gives invitation to aesthetic harm. To avoid contributing to the global problem of waste monitoring and disposal, the proposed system will continuously monitor the status of garbage dustbin.

In present scenario we can see a big problem around us that is nothing but sometimes the bins are full and the garbage vans don't pick up the garbage due to which garbage bins overflows and spread on the road. Sometimes when a garbage when reaches to pick up the garbage the garbage bins are empty this causes the wastage of fuel of the van. All these happens just because of absence of efficient garbage monitoring and causes serious environmental problems and cost issues. In smart garbage bins, the battery based dustbins send the information to garbage collecting authority using GSM module and then authority can take decision in accordance with the information sent by GSM module. The main objective of the system is to:

- Reduce the amount of garbage overflowing from dustbins.
- To avoid to contributing the global problem of garbage monitoring.
- To avoid fuel consumption

2. LITERATURE REVIEW

In [1], they presented a system which consists of Zigbee, GSM and ARM7 controller. Sensors are used in this system which senses the level of garbage and give the data to the controller. The controller will further send the data to the driver of the garbage collecting truck using GSM.

In [2] they proposed a system in which Solid waste monitoring and management using RFID, GIS and GSM is done. The system consists of RFID system, mobile communication like GSM and geographical information system (GIS) for tracking vehicle position.

In [3] their system is an android based application where the user himself can contribute to clean his city, notify volunteer to come forward or can inform city corporation.

In[4] they came up with, smart bin is built on a microcontroller based platform Arduino Uno board which is interfaced with GSM modem and Ultrasonic sensor. Ultrasonic sensor is placed at the top of the dustbin which will measure the stature of the dustbin.

In [5] they have used modern traceability devices, like volumetric sensors, identification RFID (Radio Frequency Identification) systems, GPRS (General Packet Radio Service) and GPS (Global Positioning System) technology, permit to obtain data in real time, which is fundamental to implement an efficient and innovative waste collection routing model.

3. COMPONENTS AND TOOLS USED

3.1 Hardware Used

- Arduino Uno Board
- Ultrasonic Sensor (HC-SR04)
- 3)GSM Module
- 4)Gas Sensor (MQ135)
- 5)NodeMCU(ESP8266)
- 6)Bread Board
- 7)Jumper Wires

3.2 Software Used

Arduino IDE

4. PROPOSED SYSTEM

The traditional garbage monitoring system has a limitations and it is time consuming , the garbage collecting vans goes to the place where the dustbin is placed and empty the dustbin, even they are empty still garbage collecting authority have to visit the place. This causes waste of fuel and human energy. So, proposed model tells about the recent improvements in technology and helps us for making our place clean and tidy.

To create a cost effective, reliable , “IoT based Garbage Monitoring System” we have to monitor the garbage bins or dustbins. It will inform the live status of dustbin to the garbage collecting authority, and in accordance with that the authority will manage the bin. Which will help them to maintain the cleanliness in the environment. Last but not least it will help to make the city a smarter one.

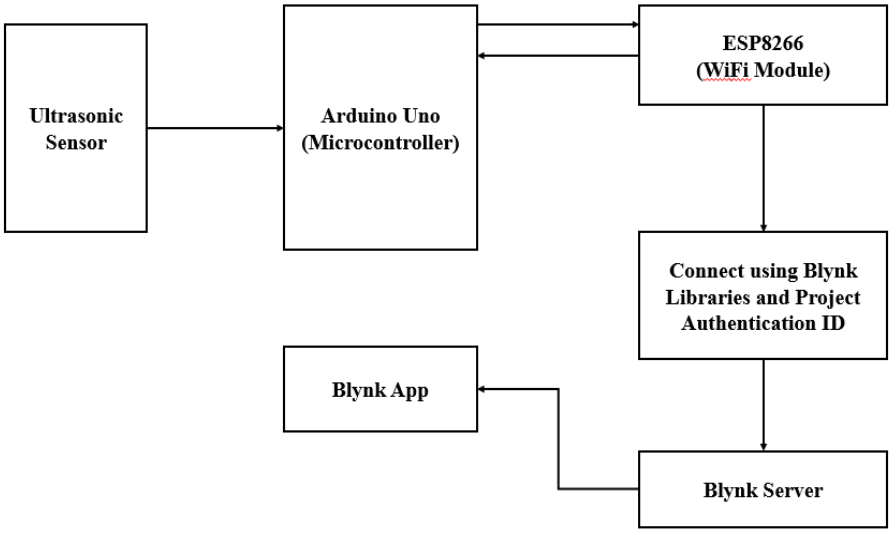

Fig. 1: System Architecture

5. SYSTEM ARCHITECTURE

The Block diagram depicts various components used in the Garbage Monitoring System. Blynk Server, GSM Module, Arduino Kit, Ultrasonic Sensor. Here sensors help in detecting the level in the dustbin whether the dustbins are full or empty. The sensor acquires the data and the data is then send to Arduino Micro-controller. Battery power supply of +5V is given to the Arduino microcontroller for the functioning of the system and the Arduino takes the sensor data from Ultrasonic Sensor and process it.

6. CONFIGURING BLYNK

App To connect to the internet we make use of a prebuilt platform called Blynk app. After the user installs the Blynk app on the smartphone, an account to be created in the app to access its services. The services are enabled for the signed users. Let us create

an account and add a new project to get started. An unique authentication code is used by the code to communicate with the project. The Blynk needs to be running in the background for the user to get real time notifications. The working process of the proposed model can be clearly seen in the following figure 1 . The configuration of Blynk app and account creation is shown in figure 2.

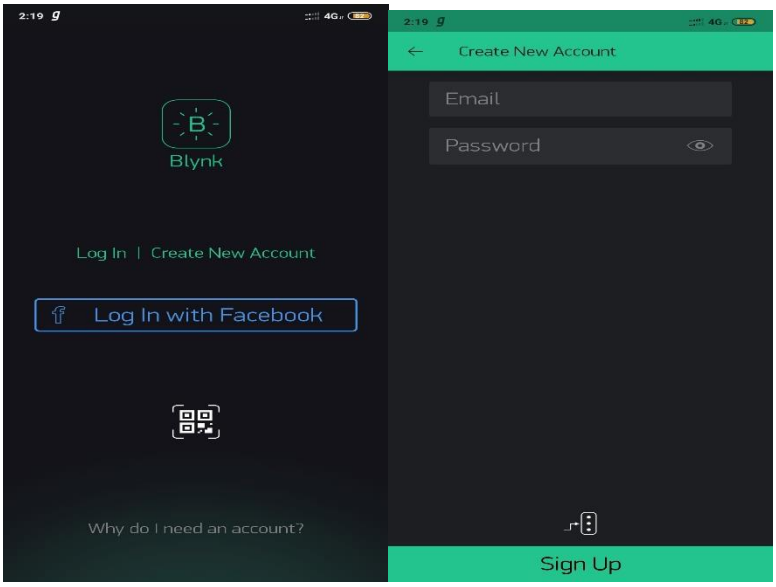

Fig. 2. Configuration with Blynk app and account creation

7. WORKING PROCESS

After the account creation, the arduino will first read the ultrasonic sensor, It will send the signal with the speed of sound. It revert back after striking the object and the travel time is store based on equation1. Thus the distance of the object is calculated. Based on the distance we can identify the garbage level to be low or high. We used the term "overflow" to indicate the necessary for cleaning process. Thus the mobile is enable with the term as "Overflow".

8. CONCLUSION

In this paper we have given design and implementation of smart dustbin. This smart garbage monitoring system is capable of sending its garbage level upto a range of 100m. A GSM module is connected which sends a message to the authority when the level of garbage in any bin crosses the threshold level. Further one can set or alter the threshold level through programming. This is a cost effective system to deal with the problem of Garbage Bin Monitoring and it can effectively tackle the problem of overloading of garbage bins and spreading the garbage in environment. It could be a effective mechanism to make our environment and society neet,clean and healthy.

9. REFERENCES

[1] Kanchan Mahajan, Prof.J.S.Chitode, "Waste Bin Monitoring System Using Integrated Technologies", International Journal of Innovative Research in Science, Engineering and Technology (An ISO 3297: 2007 Certified Organization) Vol. 3, Issue 7, July 2014.

[2] M. Faccio, A. Persona, and G. Zanin, "Waste collection multi objective model with real time traceability data," Waste Management,vol. 31, no. 12, pp. 2391-2405,2011.

[3] Ahmed Imteaj, Mahfuzulhoq Chowdhury and Md. Arafin Mahamud, "Dissipation of Waste using Dynamic Perception and Alarming System: A Smart City Application" , 2nd Int'l Conf on Electrical Engineering and Information & Communication Technology (ICEEICT) 2015 Jahangirnagar University, Dhaka-1342, Bangladesh, 21-23 May 2015

[4] Monika K A, Nikitha Rao, Prapulla S B, Shobha G, Smart Dustbin-An Efficient Garbage Monitoring System, International Journal of Innovative Research in Science,Engineering and Technology,2016 Research Article, Volume 6 Issue No. 6, ISSN: 2321 3361.

[5] M. Faccio, A. Persona, and G. Zanin, "Waste collection multi objective model with real time traceability data," Waste Management,vol. 31, no. 12, pp. 2391-2405,2011.

