IOT Based Smart Garbage Alert System using Arduino UNO

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ABSTRACT: Waste management is one of the primary problem that the world faces irrespective of the case of developed or developing country. The key issue in the waste management is that the garbage bin at
public places gets overflowed well in advance before the commencement of the next cleaning process. It in turn leads to various hazards such as bad odor & ugliness to that place which may be the root cause for spread of various diseases. To avoid all such hazardous scenario and maintain public cleanliness and health this work is mounted on a smart garbage system. The main theme of the work is to develop a smart intelligent garbage alert system for a proper garbage management .This paper proposes a smart alert system for garbage clearance by giving an alert signal to the municipal web server for instant cleaning of dustbin with proper verification based on level of garbage filling. This process is aided by the ultrasonic sensor which is interfaced with Arduino UNO to check the level of garbage filled in the dustbin and sends the alert to the municipal web server once if garbage is filled . After cleaning the dustbin, the driver confirms the task of emptying the garbage it also enhances the smart garbage alert system by providing automatic identification of garbage filled in the dustbin and sends the status of clean-up to the server affirming that the work is done. The whole process is upheld by an embedded module integrated with IOT Facilitation. The real time status of how waste collection is being done could be monitored and followed up by the municipality authority with the aid of this system. In addition to this the necessary remedial / alternate measures could be adapted. An Android application is developed and linked to a web server to intimate the alerts from the microcontroller to the urban office and to perform the remote monitoring of the cleaning process, done by the workers, thereby reducing the manual process of monitoring and verification. The notifications are sent to the Android application using Wi-Fi module.

KEYWORDS: IOT,GSM module, Arduino UNO c and java language.

I. INTRODUCTION

Internet and its applications have become an integral part of today's human lifestyle. It has become an essential tool in every aspect. Due to the tremendous demand and necessity, researchers went beyond connecting just

computers into the web. These researches led to the birth of a sensational gizmo, Internet of Things (IoT). Communication over the internet has grown from user -user interaction to device –device interactions these days. The IoT concepts were proposed years back but still it's in the initial stage of commercial deployment. Home automation industry and transportation industries are seeing rapid growth with IoT. Yet not many articles have been published in this field of study. Since most of the process is done through the internet we must have an active high speed internet connection. The technology can be simply explained as a connection between humans-computers-things. All the equipment's we use in our day to day life can be controlled and monitored using the IoT.

A majority of process is done with the help of sensors in IoT. Sensors are deployed everywhere and these sensors convert raw physical data into digital signals and transmits them to its control center. By this way we can monitor

environment changes remotely from any part of the world via internet. This systems architecture would be based on context of operations and processes in real-time scenarios.

Smart collection bin works in the similar manner with the combination of sensors namely weight sensor and IR sensor that indicates its weight and level respectively. The IR sensors will show us the various levels of garbage in the dustbins and also the weight sensor gets activated to send its output ahead when its threshold level is crossed. These details are further given to the microcontroller (ATMEGA 328) and the controller gives the details to the transmitter module (GSM module). At the receiver section a mobile handset is needed to be connected to the GSM router so the details of the garbage bin are displayed onto the HTML page in web browser of our mobile handset..

II. RELATED WORK

The Internet of Things (IOT) is a concept in which surrounding objects are connected through wired and wireless networks without user intervention. In the field of IOT, the objects communicate and exchange information to provide advanced intelligent services for users. Owing to the recent advances in mobile devices equipped with various sensors and communication modules, together with communication network technologies such as WIFI and GSM, the IOT has gained considerable academic interests. The term Internet of Things was introduced by Kevin Ashton, who was the director of the Auto-ID Centre of MIT in 1999. The initial technical realization of IOT was achieved by utilizing RFID technology for the identification and tracking of devices and storing device information. However, IOT utilizing RFID technology was limited to object tracking and extracting information of specific objects. The current IOT performs sensing, actuating, data gathering, storing, and processing by connecting physical or virtual devices to the Internet. For IOT applications performing these functions, a variety of researches on IOT services including environmental monitoring, object tracking, traffic management, health care, and smart home technology are being conducted.

Owing to the characteristics and merits of IOT services, waste management has also become a significant issue in academia, industry, and government as major IOT application fields. An indiscriminate and illegal discharge of waste, an absence of waste disposal and management systems, and inefficient waste management policies have caused serious environmental problems and have incurred considerable costs for waste disposal. To handle these problems, various researches into waste management based on IOT technology have been conducted, from studies on RFID technology to studies on waste management platforms and systems.
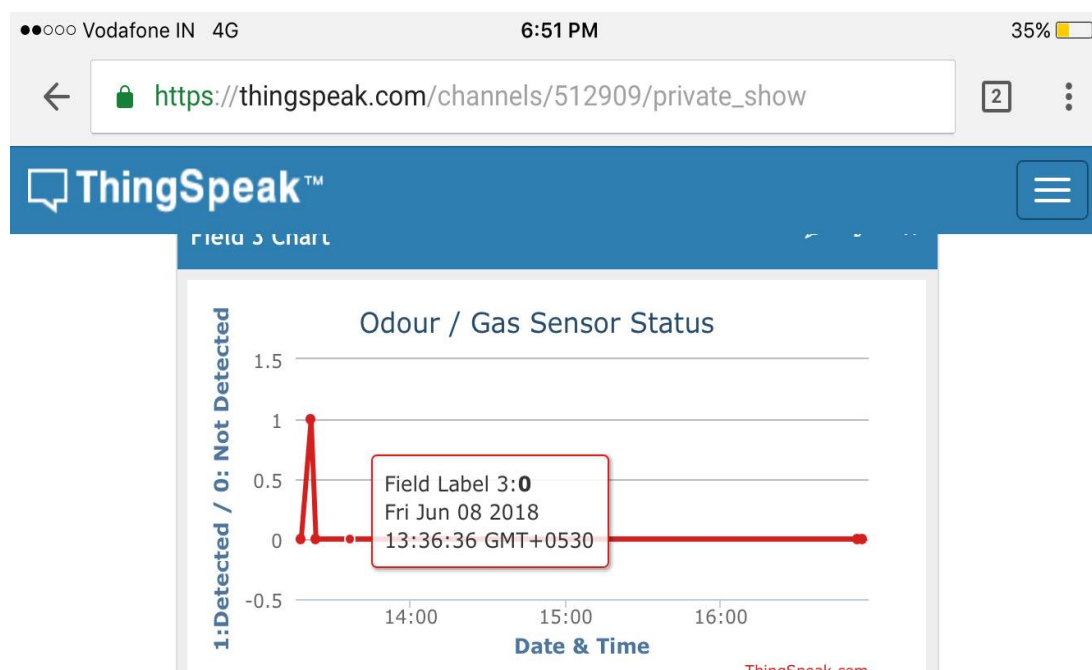
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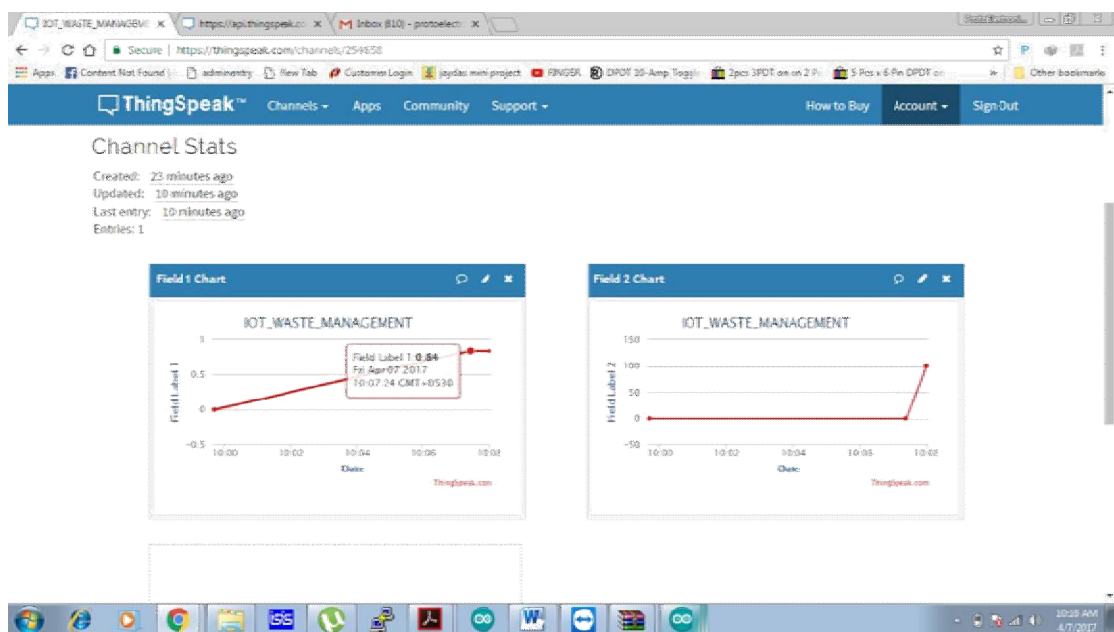
IV. CONCLUSION

This project work is the implementation of smart garbage management system using IR sensor, microcontroller and GSM module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor. This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimately helps to keep cleanliness in the society. Therefore, the smart garbage management system makes the garbage collection more efficient. Such systems are vulnerable to plundering of components in the system in different ways which needs to be worked on.

REFERENCES

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[2]   ,Dr. V. Parthasarathy. It gave the idea of IoT
subject and   addition details about IoT..The proper smart environment and various applications.
[3]   Internet of Things: Challenges and state-of-the-art solutions in Internet-scale Sensor Information Management and Mobile analytics by Arkady Zaslavsky, Dimitrios Georgakopoulos. This paper gave us the details about mobile analysis and sensor information management that will help in data segregation of various dustbins.
[4]   Top-k Query based dynamic scheduling for IoT-enabled small city waste collection by Theodoros Anagnostopoulos, Arkady Zaslavsky, Alexey Medvedev, Sergei Khoruzhnicov. It gave us the concept of dynamic scheduling required for the cleaning of dustbin and the Top-k query led us to priority based cleaning of dustbins.
[5]   City Garbage collection indicator using RF (ZigBee) & GSM technology. This paper gave the details for the module required for the transmission of the data to the receiver side and also the main channel follow of the project. Initially we used GSM technology for our project but later on decided to us GSMmodule for the ease of data transmission.
[6]   Smart Garbage Management System by Vikrant Bhor, Pankaj Morajkar, Maheshwar Gurav, Dishant Pandya. It provided us with additional details and designs needed for flow and management of garbage while collection.
[7]   IoT-Based Smart Garbage System for efficient food waste management by Insung Hong, Sunghoi Park, Beomseok Lee, Jaekeun Lee, Daebeom Jeong, Sehyun Park. This paper gave the overview working of the IoT based smart garbage bin and the food management.