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Smart Dustbin Based on IoT

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ABSTRACT: ***The idea is very simple and is driven by the fact the dustbin requires very frequent cleaning which is not always possible. People also see in their town that the trash bins or dustbins put in public areas are overflowing. For individuals, it produces unhygienic conditions. In fact, it contributes to various hazards, such as bad odour and ugliness, which can be the root cause of the spread of different diseases. This work is mounted on a smart garbage system to prevent all this dangerous situation and preserve public cleanliness and health. The main target is to fit more and use warning service to have the dustbin cleaned regularly. Ultrasonic sensors sense the presence of any person, after completion of the whole process, a GSM module is placed inside the smart dustbin and sends a notification to authorized user. When a smart dustbin is full of garbage then a GSM model attached with a smart dustbin will send a notification to the authorized room. By getting notification authorized users can take suitable action according to the situation.***

KEYWORDS: Dustbin, GSM, Sensor, IoT, Notification, Smart garbage system, Ultrasonic detection.

INTRODUCTION

Dustbin is the storage container used by each and every person in the world to dispose of waste. The Dustbin is the main thing they search for to dispose of waste in their environment. Smart Dustbin is just a regular bin where waste can be disposed of by anyone, but for more successful usage it is done by integrating some hardware components. With some hardware modules, such as Arduino, NODEMCU, Servo Motor, Ultrasonic sensors, Smart Dustbin is integrated. These components help to open the lid, to detect human hands and waste, and also to send an LED notice. Arduino and NODEMCU are dumped in the code needed to perform the above-mentioned procedure. IoT or Internet Stuff refers to the network of linked physical objects that without the desideratum of any human interference can communicate and share data among themselves. It has been formally defined as an "Information Society Infrastructure" since we are sanctioned by IoT to gather information from all kinds of media, such as people, animals, conveyances, kitchen appliances. Thus, by embedding them with electronic hardware such as sensors, software and networking gear, any entity in the physical world that can be provided with an IP address to allow data transmission over a network can be made part of the IoT framework.

IOT was first introduced in 1999 at auto-ID centre and Kevin Ashton first used it[1]. This latest technology promises to join all the surrounding things to a wireless network and start communicating with each other with less involvement of human beings. Things based on the internet are in the starting stage and there is no particular design still exists today. The fundamental fact is that something wasted is counterproductive to society. The ultimate need for nation growth is the key to the "smart city," the powerful ecological element that can

involve toxic emissions, impacts on human health, so the Internet of Things (IOT) offers new opportunities to make cities smarter by implementing the smart waste management system, we are taking key steps to become a smart city with few garbage bins put in citations that are important to us.

IOT Provide a solution for collection of garbage, which checks the level of garbage with the help of sensors placed over the dustbin. Once sensors sense the level of garbage in the dustbin immediately this proposed system sends an alert to authorized authority through GSM model, Web application is designed for the particular information. Many urban cities and towns of India are not well developed to ease proper garbage disposal and collection apparatus. Also, the existing infrastructure of cities is not expanding at the same pace as urbanization. A smart city project has been launched by the government of India to utilize the IT based solution to make the city cleaner. This proposed system solves three problems related to it.

(1) Garbage disposing points have large access to the public.

(2) It consumes less time and also saves fuel cost.

(3) Smart dustbin Provide facility for data collection of garbage and plan accordingly process for disposing. This ensured the healthy environment and support for Clean India Movement for cleanness.

All around the world many urban areas are developing, with the development of urban areas, the population of the urban area is also increasing. Thus, with the increase in population density, an unhealthy environment chance increases because there is an increase in the quantity of garbage and waste products. The issue with the current developing society, mainly in India, is that most of the people have less responsibility, and many of the people in society throw the garbage around the society surroundings. To overcome all these problems, this proposed system is designed, which main aim is to provide a healthy environment condition and keep the particular society clean. In recent years, there has been an exponential increase in the number of devices connecting to the Internet.

All these internet-connected devices are components of the IoT infrastructure that can interact with each other. Embedded electronics, sensors and software are part of the IoT network, allowing these devices to send and receive data from each other. This is why the use of such an existing infrastructure for the design of the proposed security system is advantageous. The drawbacks to the new system are that workers have to go and check the bins on a regular basis, whether they are filled or not, resulting in high costs. The air becomes unhygienic and disease could be spread if the bin is not emptied on time. The suggested scheme would help to eliminate all these drawbacks. The real-time data about the level of the dustbin filled on the device itself can be accessed. It would also help to reduce the cost, as workers will only have to go when the bin is complete at the time. It will also aid in the optimization of

resources and if the bins are filled every time, the air will remain healthy and free of all sorts of diseases. The towns will become healthier, and there will be much less smell of garbage.

A Smart Dustbin, based on IoT, in which the smart bin was designed on a platform based on an Aurdino Uno board that was connected to a GSM modem and an ultrasonic sensor. On top of the bin, the sensor was mounted. There was a threshold amount set at 10cm. The sensor activates the GSM modem as the waste exceeds the threshold level, which warns the related authority before the waste in the bin is emptied. In the end, it was concluded that when these smart bins were built, various issues such as affordability, maintenance and longevity were discussed. In the process of developing a smart city, it has also led to a hygienic and safe climate.

First method for garbage collection is the traditional method or use of Dustbin in the normal manner of daily life. Each and every person throws the garbage in the dustbin and if the dustbin is full, they empty the garbage from the dustbin and again use the particular Dustbin. This is the basic use of a traditional dustbin where no electronics devices are used, no coding is done and everything is manual i.e. everything is carried out by hand[2]. The second method is the use of dustbin with different colours of dustbin like green and blue dustbins which are kept together or the dustbin where only recyclable waste should be disposed. In this dustbin also not any electronics devices are used, no coding is done and everything is manual i.e. everything is carried out by hand. Only the dustbins are segregated in many types indicating which garbage should be thrown in a respective dustbin. The third technique is the Smart Dustbin, which uses Arduino, Servo Motor, Ultrasonic Sensor and GSM module electronic modules.

In this code, Arduino and the GSM module interface to open the dustbin lid and send alerts to a mobile device using the GSM module. As compared with the above dustbins, this smart dustbin is a powerful and effective one. This smart dustbin operates as follows: the front side of the dustbin has an ultrasonic sensor and this sensor is attached to the dustbin lid and to the Arduino ultrasonic sensor. When the hand and waste are placed in front of that sensor and the lid of that dustbin is opened and the waste is put into it, the ultrasonic sensor senses human hand and waste. Inside the dustbin, there is another ultrasonic sensor where the height of the waste inside the dustbin is measured and this distance is sent to a cell phone as a warning using the GSM module indicating that the dustbin is or is not complete. The benefits of this approach are as follows: In a dustbin, the waste is collected.

Various electronic components are used as a Smart Dustbin to create this dustbin. This dustbin automatically opens the lid of the dustbin upon detection of human hand and waste without being able to touch the dustbin which is very hygienic[3]. This dustbin also sends smartphone alerts that tell us whether the dustbin is complete or not. Given the benefits and being more effective than the two methods above, this dustbin also has some drawbacks. The drawbacks of this approach are as follows: if the mobile is not reachable or a good signal is not available, the mobile should have a good signal from a carrier to receive alerts very quickly, then notifications sent will not be received and the dustbin will not be cleaned or

emptied. Multiple users share the same bandwidth; the transmission will experience interference with enough users. Radiation is considered more dangerous than radiation from Wi-Fi[4].

CONCLUSION & DISCUSSION

In this smart dustbin system, the garbage overflow of garbage can be avoided and managed efficiently. This will intimate or send SMS or email to the authorized person through Ubidots platform. The garbage managing system and the facility of collecting the garbage presently doesn't fit to the current requirement. Hence better facility of collecting garbage and transportation should be provided. Since, this system provides the information when the bin gets completely filled with garbage, it reduces the number of times the arrival of vehicle which collects the garbage. This method finally helps in keeping the environment clean. Thus, the waste collection is made more efficient.

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