IoT Based Smart Garbage and Waste Collection Bin

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Abstract: - **Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded. It creates unhygienic conditions for people as well ugliness to that place leaving bad smell and also leading to so many diseases like malaria, fever, dengue, chikungunyaetc. From survey it is known that in the world the death rate because of mosquitoes bite is more so it is necessary to clean the dust bin from time to time and also well in advance. Because of these diseases are incurable and take the life of human beings. To avoid all such situations we are going to implement a project called IOT based smart garbage and waste collection bins.These dustbins are interfaced with microcontroller based system having IR wireless systems along with central system showing current status of garbage. The status will be wirelessly sendto the control unit. The main aim of this project is to reduce human resources and efforts along with the enhancement of a smart city vision.**

I. INTRODUCTION

Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded. It creates unhygienic conditions for people as well ugliness to that place leaving bad smell and also leading to so many diseases like malaria, fever, dengue, chikungunya etc.The main aim of this project is to reduce human resources and efforts along with the enhancement of a smart city vision. The internet of things (IOT) is the network of physical devices, vehicles, home appliances and other items embedded and electronics, software, sensors, actuators,and network connectivity which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing internet infrastructure. Experts estimate that the IOT will consist of about 30 billion objects by 2020. It is also estimated that the global market value of IOT will reach $7.1 trillion by 2020. The IOT allows objects to be sensed or controlled remotely across existing network infrastructure, creating opportunities for more direct integration of physical world into computer based systems, and resulting in improved efficiency, accuracy and economic benefit in addition to reduced human intervention. When IOT is augmented with sensors and actuators, the technology becomes an instance of the more general class of cyber-physical systems, which also encompasses technologies such as smart grids, virtual power plants, smart homes, intelligent transportation and smart cities. Things in the IOT sense can refer to a wide variety of devices such as heart monitoring implants, biochip transponders on farm animals, cameras streaming live feeds of wild animals in coastal waters, automobiles with built-in sensors, DNA analysis devices for environmental/food/pathogen monitoring, or field operation devices that assist firefighters in search and rescue operations. Legal scholars suggest regarding things as an inextricable mixture of hardware, software, data and service. These devices collect useful data with the help of various existing technologies and then autonomously flow the data between other devices. The term "the internet of things" was coined by Kevin Ashton of Procter and Gamble, later MIT's Auto-ID Center, in 1999. 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.

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 inIoT. Sensors are deployed everywhere and these sensors convert raw physical data into digital signals and transmits them to its control centre. 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 sensor namely IR sensor that indicates its different levels respectively. The IR sensors will show us
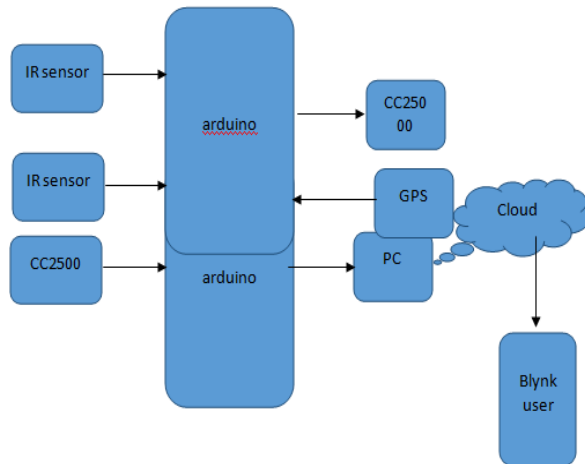
the various levels of garbage in the dustbins and these values are send to the control unit through Wi-fi.

II. METHODOLOGY

III. WORKING PRINCIPLE

The system consists of a dustbin, fitted with two IR sensors as shown in fig(1). Both for sensing the waste in the dustbin. This sensor values are given to the Arduino for processing and the values from Arduino are then send to the PC through CC2500. The PC will be having wi-fi connection through which it uploads the sensor values to the cloud. The concerned person can access these values through Blynk app installed on his android phone. From the sensors the signals are sent to the microcontroller and through the control unit the message is sent to the cloud using the arduino for processing and the values from arduino are then send to the PC through CC2500.

The message in the cloud is accessed by the authorized person or the particular authority by installing the Blynk app in their smart phones they will get the message about the garbage overloading. By installing the app in the smart phone the authorized person or the authority and by this message the garbage will be cleaned by sending the garbage trucks with the necessary information of the garbage location and the area.

IV. APPLICATIONS

- ❖ In metropolitan cities like Bangalore Hyderabad by this idea the overloading of the bins will not take place.
- ❖ The surroundings of the bin area can be kept clean by this idea.
- ❖ In metropolitan cities it is more suitable because of the more garbage.

- ❖ It can be adopted in the huge apartments where the garbage collection is more.

V. ADVANTAGES

- ❖ It is a hassle free process since there is less human involvement in the process.
- ❖ This process involves the sensors for sensing the garbage in the bin it will not be overloaded since it sends the message to the authorized person or the authorized authority before overloading.
- ❖ The fuel cost is reduced because the movement of the garbage vehicle takes place when the bin is full. Thus by avoiding the unnecessary movement of the vehicle daily to the bin area.
- ❖ By using this process the city will be clean since the garbage bins are unloaded from time to time.

IV. CONCLUSION

This project work is the implementation of smart garbage management system using IR sensor, microcontroller and Wi-Fi 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.

V. ACKNOWLEDGEMENT

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