

Google Map Based Automated Garbage Management System

Basavaraj Jakkali

Associate Professor Dept. of CSE, BMSCE, Bengaluru, India

Abstract- In many places, Dustbins are not cleaned at proper time this leads to different kinds of diseases, large number of insects and mosquitos, Waste management becomes an big issue. To avoid such situation we are planning to design “Internet of Things (IoT) based Efficient Garbage Management System” the concept in which surrounding objects are connected to Internet with wired or wireless network without any user interference. In this paper, we will describe smart dustbin based on Arduino Uno board which is interfaced with GPS modem, GSM module and Ultrasonic sensor place on smart dustbin which will measure the status of the dustbin. When the level reaches to the threshold limit, the device will inform to the concern authority and immediate action to be made to clean the dustbins. We are using Google map to find the location of dustbin.

Index Terms- Internet of Things (IoT), Arduino Uno, Ultrasonic sensor, PIR Sensor, Servo Motor, WiFi module, GSM Module, GPS Modem, Weight Sensor.

I. INTRODUCTION

Communication of the devices connected to an internet enabled network constitutes what is called 'Internet of Things'. The activity of sensing, communicating, networking and producing new information are the basic key features of Internet of Things (IoT). The Internet of Things conceptually embodies intelligent visions of automating the day to day activities. Ideally, IoT will optimize our future routines with intelligent and robust systems that will make our life not only easily but also fast based upon our preferences and priorities like morning alarms, coffee timing, medicine uptake etc. In short, IoT has the power to meet our every need before we even realize what we want and what we need. Interconnectedness and automation is the real power of IoT solutions. IoT has not only made our lives easier but also has lots of potential to drive economic value and social change.

Waste management is a big challenge in urban areas for most of the countries throughout the world. An efficient waste management is a pre requisition for maintain a safe and green environment as there are increasing all kinds of waste disposal. There are many technologies are used for waste collection as well as for well managed recycling. The Information gathering is big and cumbersome. The concurrent effects of a fast national growth rate, of a large and dense residential area and a pressing demand for urban environmental protection create a challenging framework for waste management. The complexity of context and procedures is indeed a primary concern of local municipal authorities due to problems related to the collection, transportation and processing of residential waste today the garbage collection is manual which takes a lot of efforts and is time consuming. It is comprehensive logistics solution that saves time, money and the environment. It uses sensors to measure and forecast the fill level of waste containers and generates smart collection plans using the most efficient schedules and can track the dustbins via google map.

In this project, we are able to prevent the overflow of garbage in the dustbin and the dustbin system will send the status of the garbage level to the cloud. The administrator can see the dustbins data in the website application and also can see the location of the dustbins using google maps.

II. LITERATURE SURVEY

According to the analysis of GIS (Geographical information Systems). It is found that all the dustbins are burnt with wastes and causing pollution to the environment. The results thus obtained would help to understand the present situation of the waste management of city and to optimally place the required number of dustbins to prevent further

pollution to environment. Another method for garbage management is introduced [2] survey paper as follows. A dustbin is interfaced with microcontroller based system having IR wireless systems along with central system showing current status of garbage, on mobile web browser with html page by Wi-Fi. Hence the status will be updated on to the html page. There by to reduce human resources and efforts along with the enhancement of a smart city vision. Considering the need of modern technology, the smart garbage bin can expensive but considering the amount of dustbin needed in India, there for they used based sensors to reduce its cost and also make it efficient in applications. And at the sender side they used only a Wi-Fi module to send and receive data. But because of IR sensor we can detect only level of the dustbin So, we are using weight sensor and GPS module in the proposed system to make garbage management very efficiently.

In the ZigBee, GSM (Global System for Mobile Communication) and microcontroller is used to form the Integrated system to monitor the waste bins remotely. When the garbage reaches the level of the sensor, then that indication will be given to micro controller. The controller will give indication to the driver of garbage collection truck via SMS. So, in the above survey papers of using IR sensors and Zigbee technology is not useful to create efficient garbage system. Because, of this we are using Google map based automated waste management system to prevent overflow of the dustbin .in this we are calculating level of the dustbin and weight of the dustbin and send status of the dustbin to the server and can track location of the dustbin by the administrator.

III. PROBLEM STATEMENT

As we have seen number of times the dustbins are getting overflowed and concern person don't get the information within a time and due to which unsanitary condition formed in the surroundings, at the same time bad smell spread out due to waste, bad look of the city which paves the way for air pollution and to some harmful diseases around the locality which is easily spreadable. The waste management based on Google maps is compatible mainly with concept of smart cities.

The main objectives of our proposed system are as follows:

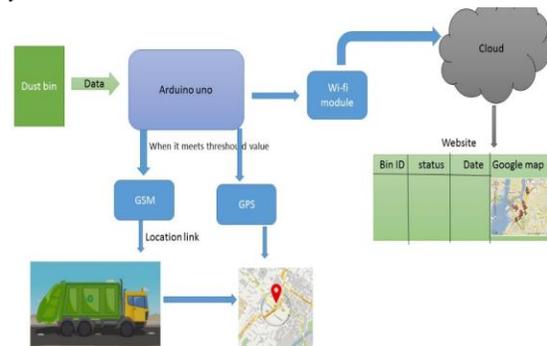
1. Monitoring the waste management.
2. Providing a smart technology for waste system.
3. Avoiding human intervention.
4. Reducing human time and effort
5. Resulting in healthy and waste ridden environment.

IV. PROPOSED SYSTEM

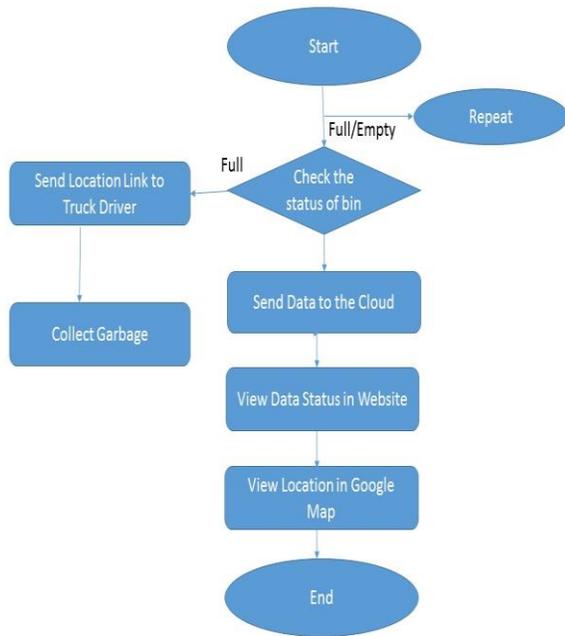
In this system we are building a smart Dustbin, which has an ultrasonic sensor install on it which will monitor the garbage level in the dustbin. For installing ultrasonic sensor on it we are using an Arduino UNO board. The specialty of Arduino Uno is that it can be connected to the system by wired or wireless network. We are using weighing sensor to calculate the weight of garbage and it will monitor the weight of garbage in the dustbin. When ever the waste is dumped into the dustbin the ultrasonic sensor will sense the level of the dustbin and the weight sensor will sense the weight of the garbage in the dustbin and send the data to the server, server will collect all the data and store it in database. If the dustbin gets full the sensor will give an alert signal, then that signal is forwarded to the waste collectors. This alert includes the dustbin location, level of the dustbin, weight of the dustbin and the shortest path from the location of bin to the dumping area. The waste collectors will collect the waste from that bin and follow the optimal path to the dumping area. This system will help for the person who collects the waste, by collecting the waste in sequential path other than collecting in rounds and rounds.

V. ARCHITECTURE OF THE PROPOSED SYSTEM

System Architecture



Flow Chart



VI. CONCLUSION

Automatic waste management system will help to increase health and hygiene level of society. Which will also help to maintain disease free world. The proposed method for the management of wastes is efficient and time saving process. This automation of waste also reduces the human effort. Using this we can prevent the overflow of garbage in dustbin and the administrator can see the location of dustbins using google maps and also the truck driver can see the google location of dustbin which is full. So this can help to the truck driver to track the dustbin in easy way.

VII. FUTURE SCOPE

This can be made much more useful by use of drones which is able to collect the garbage and around the bin, put them in respective garbage vehicles. This helps in reducing the cost, manpower and also saves the time.

For future, instead of person in the vehicle we can make use of a line follower robot which does not require a man power to move the vehicle. This path follower robot is able to follow line marked on contrasting background usually black line on a white surface or white line on a black surface. So using line follower robot technology vehicle moves to the

particular trash bin area based on the information sent from the sensors in the dustbin. So this makes the system more reliable.

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