Automated self navigating smart dustbin using IOT

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Abstract—Garbage bins placed at public places in the cities are overflowing due to increase in the waste every day. It creates unhygienic condition for the people and produces bad smell around the surroundings which spreads some deadly diseases & human illness. To avoid such a situation "IoT Based Waste Management Using Smart Dustbin" is designed. Multiple dustbins located throughout the city or the Campusare considered. These dustbins are provided with sensors which help in tracking the level of the garbage bins and an unique ID is provided for every dustbin in the city, so that it is easy to identify which garbage bin is full. When the level reaches the threshold limit, the device will transmit the level along with the unique ID provided. Once the bins are full then user will not be able to access the bins. In such circumstances the bin displays the direction of the nearby bins on LED displays. It also generates the voice messages if the user place the waste on the floor. The status of the bin is accessed by the concern authorities from their place with the help of Internet and an immediate action is taken to replace overflowing bins with the empty bins.For this system,Microcontroller processes the data from the sensor and it sends information to the authorized person via IoT.To monitor and integrate, an android application is developed for transmitting and storing the

desired information which is related to the various level of waste in different locations. This ensures the green and clean environment.

Keywords—IoT, Garbage, Sensors.

I. INTRODUCTION

As the world is in a stage of upgradation, there is one problem,we have to deal with the garbage.In our daily life, we see the pictures of overflown garbage bins and the excess garbage spills out. This leads to a number of diseases as large number of insects and mosquitoes breed on it. A big challenge in the urban cities is solid waste management. Hence, such a system has to be build which can eradicate this problem or at least reduce it to the minimum level. The project gives us one

of the most efficient ways to keep our environment clean and green.There are many existing expertise mechanisms for handling as well as managing waste. But, gathering

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information is a challenging task.This miscommunication will affect the fast national growth rate in dense suburban area and also it is increasing demand for urban ecological protection.A

major challenge in waste management system is to create a prototype to overcome the lack of coordination among

government, people and local authority for shipping and processing waste.Now with the rise of technology it is high time that we should use technology for waste management systems. So, in this paper we have integrated analytics and electronics in order to create optimal changes in the conventional methodology of waste collection with the large amount of data that is being produced by the smart bin networks.The movement of waste across the whole city can be tracked and thus can be monitored by a single system efficiently and concretely. This system can prove to be a revolution for the whole urban waste management system of upcoming smart cities.

II.OBJECTIVE

The Internet of Things (IoT) is a concept in which surrounding objects are connected through wired and wireless networks without user intervention. Objects communicate and exchange information. In this system multiple dustbins are located throughout the city or the Campus.These dustbins are provided with a sensor which helps in tracking the level of the garbage bins and a unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is full. When the level of the bin reaches the threshold limit, the device will transmit the reading along with the unique ID provided. After that the dustbin will move for dispatch the excess waste to the particular navigated place.In this project is to design and build a prototype for an automatic open dustbin that can automatically open the lid when it detects the people who want to throw out their trash. Once the bins are full then user will not be able to access the bins. In such circumstances the bin displays the direction of the nearby bins on LCD which display also generate the voice messages if the user place the waste on the floor. The status of the bin is accessed by the concerned authorities from their place with the help of Internet and an immediate action will be taken to replace overflowing bins with the empty bins.

III.PROPOSED SYSTEM

In proposed system,level,rain and gas sensors are used to detect the respective parameters and garbage level is monitored by using IoT system andtake necessary steps.In this system,automatically opens the lid when it detects the people who want to throw out their trash. Once the bins are full then user will not be able to access the bins.

A.BLOCK DIAGRAM
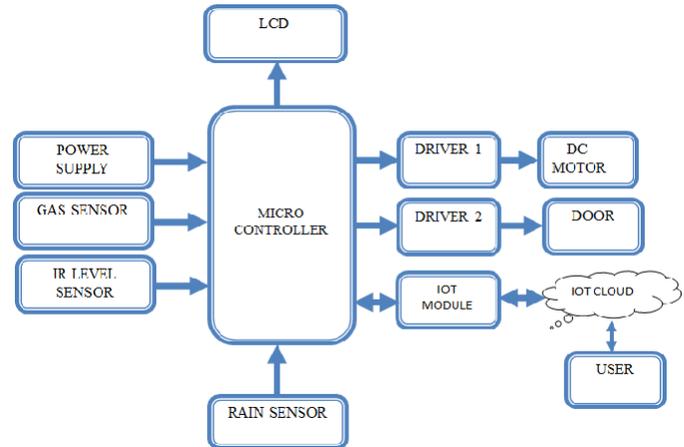
B.DESCRIPTION

The level sensor monitors the level of dust and incase it is filled intimation is send to the respective person.After a particular time spell, it will automatically move to the collection area and the contents are emptied.The rain sensor is a switching device activated by rainfall.If rain is detect at the door of the garbage bin is automatically closed. The gas sensor is used to identify the toxic material. If it detects any toxic material inside the garbage,it will automatically move to the collection area and emptied the bin.The microcontroller processes the data from the sensor and it sends information to the authorized person via IoT.In this system, automatically open the lid when it detects the people who want to throw out their trash. The LCD displays the status of the garbage.The Internet of Things (IoT) intimates the status of garbage bin to the registered mobile number.

C.CIRCUIT DIAGRAM

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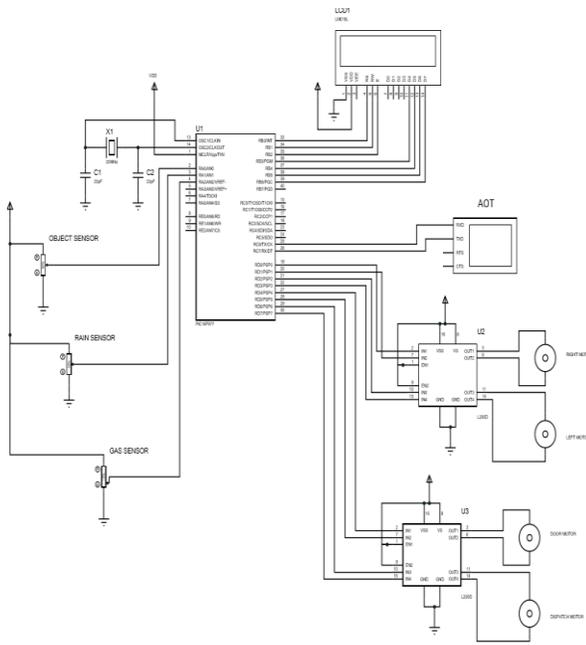
D.CIRCUIT DESCRIPTION

The circuit consists of sensor network such as IR level sensor,gas sensor,rain sensor and four Dc motor ,two motor driver,IoT module.The level sensor is used to detect the level of trash in the garbage bin.The gas sensor is used to detect the toxic material inside the bin.The rain sensor is used to detect the rain at the door of the bin.Each motor driver L293 controls the two DC motor simultaneously.The IoT system used to send garbage bin info to the authorized person.

E.HARDWARE DESCRIPTION
1.RAIN SENSOR

A rain sensor or rain switch is a switching device activated by rainfall. It is made up of two parallel conducting material such as copper, aluminum.

2.IR LEVEL SENSOR

An infrared sensor is an electronic device that emits and detects infrared radiation in order to sense some aspect of its surroundings.It detects the level of garbage bin.

3.GAS SENSOR

Gas sensor measure and indicate the concentration of certain gases in an air via different technologies. Typically employed to prevent toxic exposure and fire, gas detectors are often battery operated devices used for safety purposes.

4.DC MOTOR

DC or direct electric current motor works on the principal,when a electric current carrying conductor is placed in a magnetic field, it experiences a torque and has a tendency to move. This is known as motoring action. If the direction of electric current in the wire is reversed, the direction of rotation also reverses. When magnetic field and electric field interact they produce a mechanical force, and based on that the working principle of dc motor established.

5.L293D MOTOR DRIVER

A motor driver is an integrated circuit chip which is usually used to control motors in autonomous robots. Motor driver act as an interface between Microcontroller and the motors.The most commonly used motor driver IC's are from the L293 series such as L293D, L293NE, etc. These ICs are designed to control 2 DC motors simultaneously. L293D consist of two H-bridge. H-bridge is the simplest circuit for controlling a low current rated motor. We will be referring the motor driver IC as L293D only. L293D has 16 pins.

6.INTERNET OF THINGS (IoT)

The internet of things (IoT) is the network of physical devices, vehicles, buildings and other items—embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.It allows objects to be sensed and controlled remotely across existing network infrastructure, creating opportunities for more direct integration of the physical world into computer-based systems, and resulting in improved efficiency, accuracy and economic benefit.

IV.RESULTS AND DISCUSSIONS
The following results are observed from this work-

- Detection of garbage level in the bin.
- Wireless transmission of information using IoT module.
- Overflow of the bins can be avoided .

This IoT based garbage management is very useful for smart cities in different aspects. We have seen that, in cities there are different dustbins located in the different areas and dustbins get overflowed

many times and the concerned people do not get information about this. Our system is designed to solve this issue and will provide complete details of the dustbin located in the different areas throughout the city. The concerned authority can access the information from anywhere and anytime to get the details. Accordingly they can take the decision on this immediately.

This model is providing a lot of opportunity for improvement and future development. In our project, the following enhancements can be made.

- This project is made for demo concern, it can be taken to product level .

- It can be made durable, by making it compact and cost effective .
- All the components and controlling unit can be embedded on the bin.

V.CONCLUSION

In the entire world, waste management is a major challenging one. If it is not properly dispose or cleaned it causes a lot of disease and spoil the green environment. There is need of new mechanism to properly dispose the waste. In our project, we have developed an efficient waste management system .Technology is used to provide better garbage disposal methods in urban areas. We have used sensors to indicate the level of garbage in the bin. When filled, a truck driver receives a message to clean the bin. This system is eliminating the current day status about the bins which are the most of the time laying in a pathetic situation. We have also developed an android application through which the user can find a bin near him to throw the trash. This creates a direct connection where every citizen is doing his part to maintain a clean environment around him.

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