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E-Trash Management System

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Abstract - The main objective of the project is to design smart dustbin which will help in keeping our environment clean and also eco friendly. We are inspired from Swaach Bharat Mission. Nowadays technologies are getting smarter day-by-day so, as to clean the environment we are designing a smart dustbin by using ATG32 mega Microcontroller . This smart dustbin management system is built on the microcontroller based system having ultrasonic sensors on the dustbin. If dustbin is not maintained than these can cause an unhealthy environment and can cause pollute that affect our health. In this proposed technology we have designed a smart dustbin using ATG32 mega Microcontroller, along with infrared sensor, servo motor, and battery jumper wire. After all hardware and software connection, now Smart Dustbin program will be run. Dustbin lid will open when someone comes near at some range than wait for user to put garbage and close it. It's properly running or not.

For social cause; it will help toward health and hygiene, for business for we try to make it affordable to many as many possible. So that normal people to rich people can take benefit from it.

Our main target is to make it a bin that is installed by municipal cooperation on various streets and cities .

We have tried to make more efficient by using some more modern technologies like LoRa communication , basically used for long range communication and wifi module to keep it online.

We have also tried to make records of bin collections per day and tried to separate dry & metal waste also.

The bin has been desgined with various capabilities and can work as boon in management of waste by municiple departments.

Key Words: IOT, ATG32mega Microcontroller, Infrared Sensor, MAX232, GSM Modem, DC Motor, Motor Driver IC ,LED

1.Introduction

The rate of population in our country has been increasing rapidly and also we have increased in garbage which have increased environmental issues. Dustin is a container which collects garbages or The store items which is recyclable or non recyclable , decompose and non – dcompose. They are usually used in homes , office etc. but in case they are full no one is there to clean it. And the garbage are spilled out. The surrounding of a dustbin is also conducive for increasing the population level. Air pollution due to a dustbin can produce bacteria and virus which can produce life harmful diseases for humans . therefore we have designed a smart dustbin using , ATG32 mega Microcontroller ultrasonic sensor and various advanced technologies which will sense the item to be thrown in dustbin & open the lid with the help of motor . It will also send the messages to the garbage authority of that area when the bin is 80% full with garbage . It will have a cloud based data management which will keep all the details of the garbage up to date. It is an IOT based project that will bring a new way and smart way of cleaniness. It is descent gadget to make out surrounding clean.

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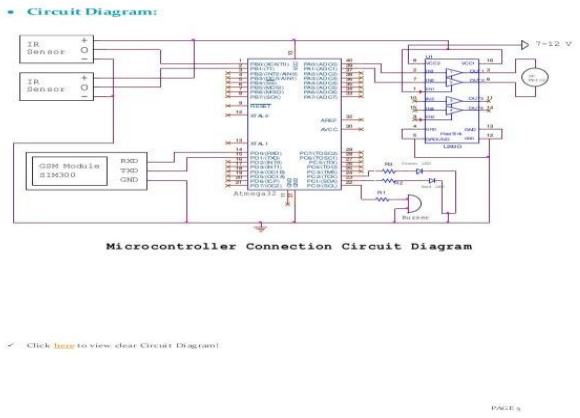
2. List of Components Used

- AVR AT mega32 Micro controller
- Infrared Sensor
- MAX232
- GSM Modem
- DC Motor
- Motor Driver IC
- LED-2
- Buzzer
- Step Down Transformer
- Bridge Rectifire
- Filter Circuit
- Resistors
- Capacitors
- Jumpers
- Wires
- Dustbin

Fig -1: Components of Smart bin

Flowchart



3. Literature Review

A Smart Waste Bin for Smart Waste Management proposed by [1], In this paper, the system consists of sensors to measure the weight of waste and the level of waste inside the bin. Bluetooth is attached for short range communication. The researchers [2] suggests the method for garbage management which is as follows. In this paper, ATG32 mega microcontroller to check the level of garbage filled in the dustbin and sends the alert to the municipal web server once if garbage is filled. The researchers [3] suggests the method for garbage management which is as follows. In this paper the system makes use of ATG32 mega Microcontroller board, LCD screen, GSM modem for sending data. The system is powered by a Battery & Transformer. The LCD screen is used to display the status of the level of garbage collected in the bins. Whereas GSM is built to show the status to the user, monitoring it with SMS.

The system puts on LCD screen continuously monitoring of garbage with ATG board. . The researchers [4] suggests the method for garbage management which is as follows. In this paper the bin was connected with a microcontroller-based system which had IR wireless system with a main central system that shows the current status of the garbage bin. The status was seen on a mobile based web browser with html page .In this system to reduce the cost they used weight sensor and on the sender's side they used a Wi-Fi module to send and receive the data. In the end the weight sensor only detects the weight of the garbage in the bin but not the level of waste.

4.Proposed System

The proposed method for this smart dustbin is use of GSM Modem and infrared sensors . A **GSM modem** or **GSM module** is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks. They use SIMs to identify their device to the network. So Using this technology the bin when it gets full sends sms to the concerned authorities .

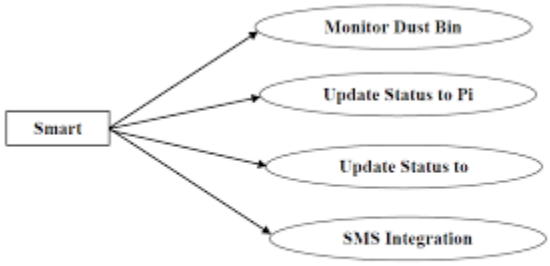


Fig 4.1: use case diagram

5. Methodology

The automation of the smart dustbin is achieved through the use of a power supply, Microcontroller (ATmega32), GSM module, PIR sensor, servo motor and all programmed on board .

5.1 PIR Sensor

PIR sensors are most commonly used in motion-based detection, such as in-home security systems.

5.2 GSM Module

A **GSM modem** or **GSM module** is a device that uses GSM mobile telephone technology to provide a wireless data link to a network. GSM modems are used in mobile telephones and other equipment that communicates with mobile telephone networks.

5.3 Microcontroller

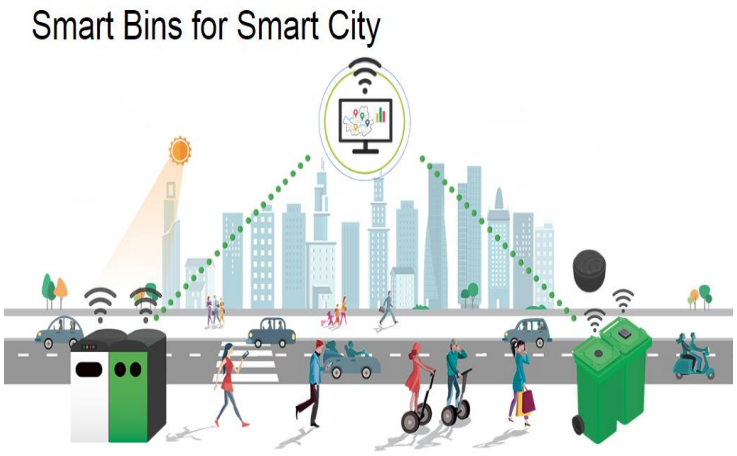
A **microcontroller** (**MCU** for *microcontroller unit*) is a small computer on a single metal-oxide-semiconductor (MOS) VLSI integrated circuit (IC) chip. Microcontrollers are used in automatically controlled products and devices, such as automobile engine control systems, implantable medical devices, remote controls, office machines, appliances, power tools, toys and other embedded systems.

5.4 Servo Motor

A servo motor is an electrical device which can push or rotate an object with great precision. If you want to rotate an object at some specific angles or distance, then you use servo motor. It is just made up of simple motor which run through servo mechanism.

6. Future Scope

The main aim of this project is to target future as the era coming up will be more modern , smart and technology dependent . This project will not only make them smart but also will save time , provide complete hygiene and help in environment cleanliness .This project can be a major success in smart places like Smart campus, cities , Metro stations , Air ports, Bus stands & likewise many places .



7. Conclusion

IOT based Dustbins help the people to manage the waste easily and help them reduce the work of calling or waiting for the specific person to make the area clean and makes a heathier environment to live. They won't be any kind of diseases and the people will be fit and are not prone to diseases caused by these waste materials. The mission Swachh Bharat can also be implemented easily. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. It will take power supply

with the help of Battery. If the dustbin is not cleaned in specific time, then the record is sent to the Sweeper or higher authority who can take appropriate action against the concerned contractor. It ultimately helps in keeping the surrounding clean and the waste management can be much easier.

8. REFERENCES

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