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GARBAGE MANAGEMENT

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ABSTRACT

The objectives of writing this paper is to study the current practices related to the various waste management initiatives taken in India for human wellbeing. The other purpose is to provide some suggestions and recommendations to improve the waste management practices in Indian towns. This paper is based on secondary research. It offers deep knowledge about the various waste management initiatives in India and find out the scope for improvement in the management of waste for the welfare of the society. To tackle all such situations we are going to implement a project called Garbage Management.

The system was proposed to design an electronic system, in order to provide a solution to irregular waste disposal system. This paper proposes a smart alert system for garbage clearance by giving an alert signal to the municipal web server for instant cleaning of dustbin with proper verification based on level of garbage filling. This process is aided by the ultrasonic sensor which is interfaced with Arduino MEGA to detect the level of garbage in the dustbin and sends the alert to the municipal web server once if garbage is filled. This will support swachh bharat for cleanliness.

Keywords :- Arduino MEGA, Ultrasonic Sensor, ESP-01 Wifi Module

I.INTRODUCTION

It is become necessary and challenging to manage the solid waste with rapid urbanization and increased population growth. But even more major and basic reason for the problems regarding with such common dustbins is still unsolved as it has not taken under consideration by the prior innovations, which is to literate people to use it properly and track and clean garbage present outside the dustbin in a fully atomized way.

While talking about waste collection and management, the attention can be highly focused towards the common dustbins placed by respective Municipal Corporation at the various area of the each city. As, it is the first stage which plays initial active role to gather the waste generated in society and will ideally fulfil the major aims like, maintaining cleanliness of society, reducing environmental pollution, managing the healthy and hygienic surrounding etc. But such aims will fail to attain practically due to number of causes such as:

- People are not finding themselves responsible to use these dustbins properly and not to throw the garbage outside the dustbin.
- Improper placement of dustbin.
- Improper management system which does not contain provision to track real time status of bin fullness

- No system is present that can sense the garbage present outside the dustbin
- No any provision is present to clean the area surrounding to the dustbin automatically in casewhere people throws garbage outside of the dustbin.

II.REVIEW OF RELEVANT LITERATURE

An inevitable consequence of development and industrial progress is generation of waste. Therefore, efficient waste management is a matter of international concern and countries have setup robust regulatory waste management regimes for balancing the objectives of development and environment sustainability.

In India, the national environment policy, 2006 while suggesting measures for collection of wastes and safe disposal of residues . The metro cities and major economic hubs generate the maximum volume of waste, but a survey of 20 smaller cities selected to be developed as smart cities show that most are struggling to manage waste. So, there should be an improvement in the waste management techniques.

Following the onset of industrialisation and the sustained urban growth of large population centres, the build-up of waste in the cities caused a rapid deterioration in levels of sanitation and the general quality of urban life.

The streets became choked with filth due to the lack of waste clearance regulations . In the UK, London, The Metropolitan Board of Works was the first city-wide authority that centralized sanitation regulation for the rapidly expanding city and the Public Health Act 1875 made it compulsory for every household to deposit their weekly waste in "moveable receptacles: for disposal—the first concept for a dust-bin . Early garbage removal trucks were simply open bodied dump trucks pulled by a team of horses. They became motorized in the early part of the 20th century and the first close body trucks to eliminate odours with a dumping lever mechanism were introduced in the 1920s in Britain.

III.METHODOLOGY

The garbage containers transmit signals to indicate that they are over 80% or 90% full and should be emptied. Signals through GSM module are sent to a web based software application used by the authority in charge. The software indicates capacity of the container which is taken as a basis to plan the best route for waste collection garbage trucks travel only to those containers that actually need to be emptied. A robust ultrasonic sensor is installed in the garbage container and it detects the fill level regardless of what has been deposited inside. The whole system contains ultrasonic sensor, Arduino MEGA, GSM Module, power supply (battery).The Arduino board and sensor is connected with the help of wires. The program is fed into the Arduino MEGA board. The power is supplied to the system with the help of a battery. GSM Module sends and receives data through radio waves. Thus the result is displayed on the software application indicating that a particular bin is full and needs to be emptied.

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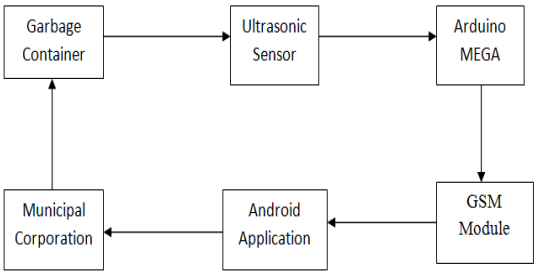
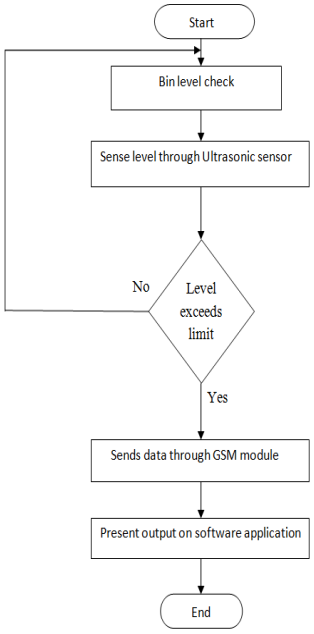


IV.ALGORITHM OF PROPOSED METHOD



V.IMPLEMENTATION

The system is implemented with the help of different modules which are explained in this section along with code snippets.

a) GARBAGE CONTAINER

A garbage container is a container for storing waste, and is usually made out of metal or plastic.

The roadside garbage bins usually consist of three types: waste bins, trash cans and wheel bins that are mobile. These are then emptied by collectors, the collectors will load the contents into a garbage truck and drive it to a dedicated area, consuming crush facility to be disposed of.

b) ULTRASONIC SENSOR

A sonic transducer is used as the ultrasonic proximity sensors, which conducts alternate reception and transmission of sound waves. The waves emitted by the transducer are reflected by an object and received back in the transducer. After emitting the sound waves, the ultrasonic sensor switches to receiving mode. The time taken between emitting and receiving wave is proportional to the distance of the object from the sensor.

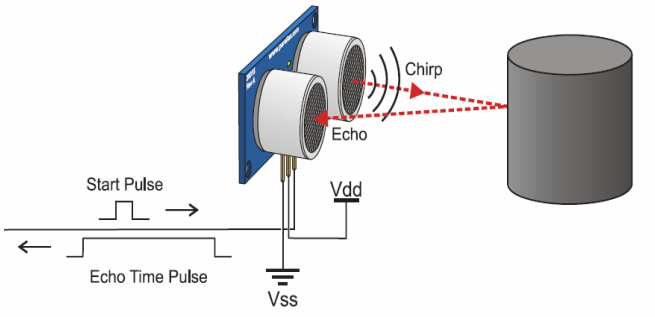


Fig. A) WORKING OF SENSOR

Ultrasonic sensors generate a high-frequency sound wave using the trigger pin and echo is received back by the sensor using echo pin, measuring the time interval between the sent signal and received signal we can determine the distance to an object.

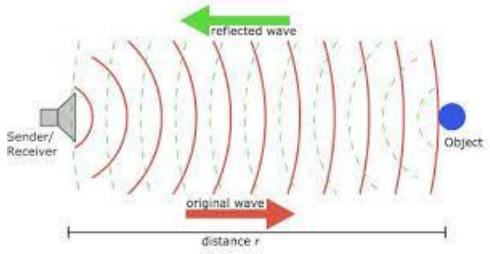


Fig. B) PRINCIPLE OF SENSOR

c) **ARDUINO BOARD**

Arduino is basically a project that was started in Italy to develope low cost hardware for design interaction. The arduino microcontroller is easy to use yet powerfull single board computer.Using the arduino board we can create interface circuits to operate various switches and sensors. This all can be done writing simple program.

Fig. C) Arduino MEGA

The Arduino Mega is a microcontroller board based on ATmega1280. It has 54-digital input/output pins which also can be used as PWM outputs,

16 analog inputs, 4 UARTs, a 16 MHz crystal oscillator, a USB connection, ICSP header, a power jack and a reset button.

Microcontroller:	ATmega1280
Operating Voltage:	5V
Input Voltage:	7-12V
Clock speed:	16MHz

d) ESP-01 Wifi Module:

The ESP is a low cost Wi-Fi chip with TCP/IP stack and microcontroller. This small module allows microcontroller to connect to a Wi-Fi network.

- 16 GPIO pins
- SPI
- I^2C
- I^2s interfaces with DMA(sharing pins with GPIO)
- UART
- 10-bits ADC

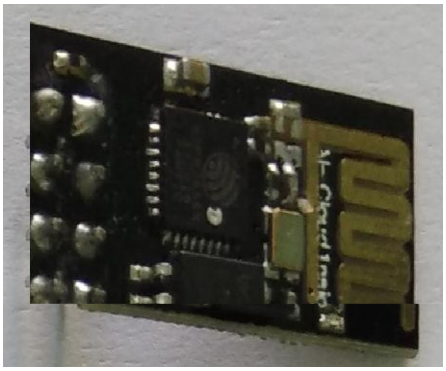


Fig. D) ESP-01 Wifi Module

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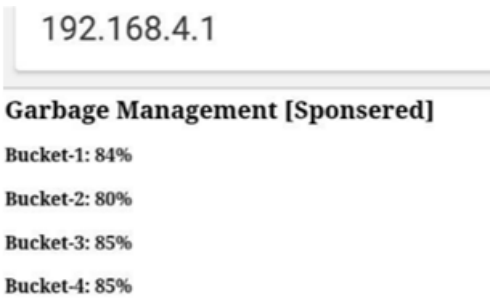
VI.RESULT

The amount of bin filled is displayed on the 16*2 LCD B1 indictaes bin number 1 and so on and the content then appears on the web server.



VII.CONCLUSION

This project work is the implementation of garbage management system using ultrasonic sensor, Arduino MEGA and Wi-Fi module. This system assures the cleaning of dustbins when the garbage level reaches its maximum level. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It helps to keep cleanliness in the public place. Therefore, the garbage management system makes the garbage collection more efficient. By using this method the collection of garbage in the city becomes more easier. It helps in reducing air pollution, traffic flow, man power, time and money. With the help of proper technology (GPS & SOFTWARE APPLICATIONS) we can guide the trucks in selecting the shortest path for garbage collection.

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