SMART GARBAGE MONITORING SYSTEM

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Abstract— ***Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded and all the garbage spills out resulting in pollution. It creates unhygienic conditions for people as well as ugliness to that place leaving bad smell. To avoid all such situations we are going to implement a project called IoT Based Smart Garbage monitoring and Waste Collection bins. This paper proposes an advanced garbage monitoring system with smart bins that alerts the authorized collector by sending alert messages for effective garbage collection in cities. The system incorporates of Arduino board for sending data and Ultrasonic sensors to detect the level of garbage collected in the bins. The buzzer gets generated in the truck when it passes through the near by area where the bin is filled with garbage. The major advantage of this proposed system is it will stop the dustbin overflowing around the road side and locality as smart bins are used in real time.***

Keywords – **Smart garbage monitoring,Waste collecting bins, Arduino, ultrasonic sensor ,Iot, buzzer.**

INTRODUCTION

Although the world is in a stage of up gradation, there is yet another problem that has to be deal with is garbage. Solid waste management is one of the major environmental problems of India. Solid waste management is the collection, transport, disposal, managing and monitoring of waste material. Many times it is observed that garbage bins are overfull and the garbage being spilled out from bins around us. This occurs due to the mismanagement of the garbage collection. This mismanagement creates the spread of garbage in community which in turn creates unhygienic environment and bad smell in the society and because of this many disease get spread in the society. Due to Urbanisation and Industrialisation large amount of wastes are produced and these wastes have become a major threat to the environment in recent years.

To avoid mismanagement of the garbage and to improve the cleanliness of the society, Garbage monitoring system is designed. In the proposed system, the level of the garbage is detected with the help of ultrasonic sensor and sent to the authorized agency for garbage collection through Arduino board and GSM system. And the buzzer is generated in the truck if it passes through the near by area where the bin is completely filled with the garbage. The event of garbage bin getting full is not strictly dependent on a time pattern, instead it sometimes becomes rapidly full or sometimes requires more than normal time to become full. Garbage Monitoring with sensors, project is an innovative step.

This project is useful for creating "Smart City" and it is based on "Internet of Things". For healthy life style cleanliness is needed and it begins with the use of smart bins. This project will help to eradicate or minimize the solid waste disposal problem.

I. RELATED WORK

Review of papers is carried to know the background, current working procedure and existing system flaws, where we can workout on unsolved problems. A variety of related papers have been reviewed and summarized as follows.

- In [1],author Theodoros Anagnostopoulos, Arkady Zaslavsky,Kostas Kolomvatsos, Alexey Medvedev, Pouria Amirian, Jeremy Morley, Stathes Hadjieftymiades presented a certain challenges and Opportunities of Waste Management in IoT-enabled Smart Cities .In this paper they have presented a comprehensive and thorough survey of ICT-enabled waste management model. From this paper we have referred Idea to Design an IOT based Garbage Collection System.

- In [2], author Keerthana B, Sonali M Raghavendran, Kalyani S, proposed an advanced Trash collection system with smart bins that alerts the authorised collector by sending alert messages for efficient Trash collection in Cities. The system brings in the way of optimized way to collect things and to maintain a clean and green environment .From this paper we referred Idea to generate Alert to authorized collector based on different level of garbage and severity to collect the garbage.

- In [3], author Parkash1, Prabu V2 proposed a system in which multiple dustbin are located throughout the city or the campus,and this dustbins are provided with low cost embedded device which helps in

tracking the level of garbage bins and unique id is assigned to bin in city to identify which garbage bin is full. From this paper we referred to the idea of assigning unique id to each bin for identification.

- In [4], author Ujwala Ravale, Anindita Khade, Namrata Patel, Suvarna Chaure, designed and evaluated a smart bin to overcome problem of garbage overflowing from bins around the road side area or localities. They have proposed system using various sensors to find 2 level of waste collected in bins. From this we have referred the idea of using sensors to find 3 level of garbage collected and estimate number of days in which the bin must be emptied.

- In [5], author B.S.Malapur, Vani R.Pattanshetti, proposed IoT technologies with management of waste and trip management in cities so that cost and time are reduced with optimized path for waste collection.Based on data stored at database path optimization is done using genetic algorithm .From this we refered to the idea of route optimization.

II. EXISTING SYSTEM:

In the existing system garbage is collected by corporation by weekly once or by 2 days once. Though the garbage shrinks and overflows the garbage bin and spread over the roads and pollutes the environment. Pollution may lead to occurrence of various diseases. In existing system people were throwing garbage in the large bins and the garbage used to overflow on roads and spread on the roads, because of these the pollution is spread into an environment as well as harm the environment. Because of contaminated environment diseases are spreading fast. The large garbage bins in the cities were overloaded and municipal corporation was not knowing about the overloaded bins. Small carts were arriving in the towns to collect the garbage and people staying in the apartments could sometimes cannot throw the garbage in the carts because till they get down the carts were went far. These system is creating a problem to the environment as well as people.Garbage bins are not managed properly they are overflown and spread contaminants in the pollution. The street dogs and animals eat the waste food and spreads over the area and creates dirty environment to avoid such situation we are planning to design IOT Based Garbage Management For Smart Cities.

Fig 1. Existing system

Disadvantages of existing system

- Time consuming and less effective
- High costs.
- Unhygienic Environment.
- Bad smell spreads and may cause illness to human beings.
- More traffic and Noise.
- Large bins in the cities are overloaded and garbage is spreading on the roads.
- Unsafe for people staying nearby.
- Wastage of energy.

III. PROPOSED SYSTEM:

In this proposed system there are multiple dustbins located through the city or the campus, these dustbins are provided with low cost embedded device which helps in tracking the level of the garbage bins and an unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is fill. When the level reaches the threshold limit, the device will transmit the level data along with the unique ID provided. When the threshold value become 25% then the corporation will get notification and again when the garbage level will reach the threshold value 50% then the second notification is send and finally if the dustbin is completely filled that is 90% then the notification is been send to the higher authority. Based on the level of garbage present in the bin an immediate action can be made to clean the dustbins. Whenever the truck passes through the near by area where the dustbin is 50% filled or 90% filled buzzer will get generated in the truck .Sometime it may happen that the truck passing through the near by area of the bin may be completely filled. Due to which it may not be able to collect the garbage. To overcome this problem the application can be developed to send the message to nearest or near by truck to collect the garbage. And the message is been send to the truck which is in the near by area. So now if that truck is empty it can easily collect the garbage and can inform about it to the higher authority. The proposed system is cost effective because it will notify thrice to the organization and they will get time to optimize the cost of transportation by route optimization technique. Android studio platform is been used for development of the application .This application will be helpful for route optimization.And this same application can be used to send the message if the truck is not able to collect the garbage when it is completely filled.

Advantages:

- Real time information regarding the level of the dustbin.
- Deployment of dustbin based on the actual needs.
- Cost Reduction and resource optimization.
- Improves Environment quality -Fewer smells -Cleaner cities
- Intelligent management of the services in the city.
- Effective usage of dustbins.

1. SYTEM ARCHITECTURE

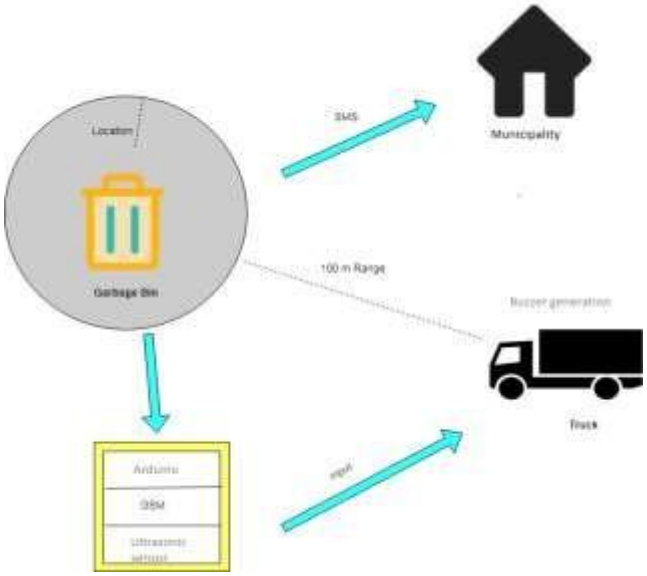

Fig 2- The proposed System model architecture

A system architecture or systems architecture is the conceptual model that defines the structure, behavior, and more views of a system. An architecture description is a formal description and representation of a system, organized in a way that supports reasoning about the structures and behaviors of the system. System architecture consist of the garbage bin ,truck, municipality office. Garbage bins placed at various location in cities consist of arduino board, GSM module and ultrasonic sensors. These components helps to analysis the level of garbage and send the message to municipality office regarding the level of garbage. A truck consist of the buzzer and it will generate the buzzer when truck is within the 100m range from the bin which is completely filled.

2. BLOCK DIAGRAM

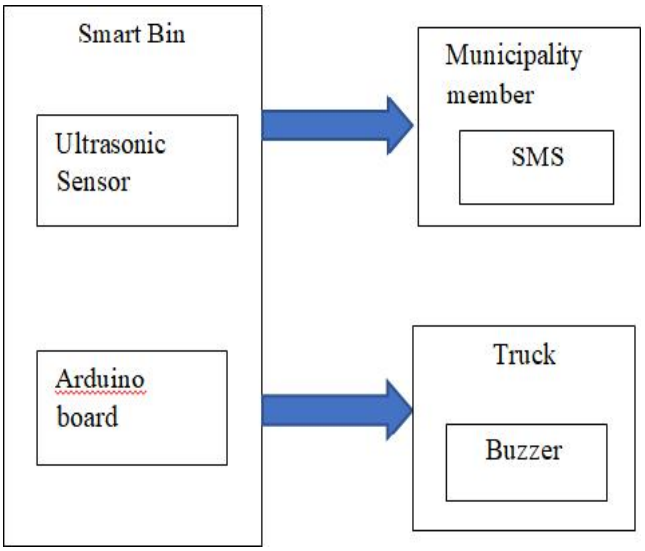

Fig.3. Block Diagram

The entire system consist a transceiver system, means that it involved both the transmitting and receiving units. On implementation process the transmitting part of the system placed along with the garbage bin while the receiving part of the system located at the controlling room of the authorized administrator, at the municipality office.

Description of Block Diagram :

The block diagram represents the system at the transmitting part or the place of the garbage collecting cart. In this part as the ultrasonic sensor sense data, the level of the bin are received by the Arduino and the Arduino at bin processes the data from ultrasonic sensor. Depending on the data processed the status of the garbage in the garbage bin is informed to the municipality. When the garbage status is high or full the information is passed to the municipality through GSM .On the other hand, the second block depicts the receiving side of the system in such a way that it receives the data from the transmitting part and processes it. The buzzer gives an alarm when data is received which is placed in truck.

Application:

- Waste Level detection inside the garbage bins and transmission of information wirelessly to concerned authorities.
- System can be accessed anytime and from anywhere
- Real-time data transmission and access
- Avoids the overflows of garbage bins.
- This project can only be used by municipal authorities or other private firms to tackle the current problem of urban waste collection.

IV. CONCLUSION:

This project is an integrated system of Ultrasonic sensor, microcontroller ,Arduino board, buzzer. Ultrasonic sensor will give the readings more accurately, it is introduced for economic and efficient garbage collection. By implementing this project we can avoid the overflowing of garbage bins in

residential areas which will prevent many diseases and hence we can maintain a clean environment. This system will automatically send the notification to the municipal corporation. The proposed system is more efficient and practical then the existing scenario of processing solid waste collection in which everything is manually done. Every smart dustbins will be given a specific ID number which will be send in the notification by using that we will get to know the location of dustbins.This project cannot be explored for waste segregation that is to identify wet and dry waste and automatic locking of the dustbin once it is 100% filled can be the future scope.

IV. REFERENCE

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