International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 08 Issue: 05 | May - 2024 SJIF Rating: 8.448 ISSN: 2582-3930

IOT BASED SMART DUSTBIN AND MANAGEMENT SYSTEM

Dr. R. GOPI [1]. M.Tech., Ph.D., (PDF).,

[1] Department of Computer Science and Engineering, Professor, Dhanalakshmi Srinivasan Engineering College, Perambalur

ABINESH K S [2], ANANTH K [2], ASHKAR A [2], GOWTHAM G [2]

[2] Department Of CSE, UG Student, Dhanalakshmi Srinivasan Engineering College, Perambalur

Abstract: ***Dustbins are used for disposing the waste. When it gets overflowed, people throw the waste outside the dustbin until the garbage collector clears the dustbin.It makes the place surrounded by mosquitoes, bugs etc., and mainly affects the environment and creates several unhygienic problems. To overcome this problem, we have proposed a system called "Smart City Waste Management System using IOT' to manage the waste. The sensors are placed on the top of normal garbage bins to measure the amount of trash and find the formation of any toxic gases. These measures make the sensors send the notifications in form of messages to waste management board.***

Keywords: Internet Of Things (IOT), Automatic Dustbin, Sensor Networks, Wireless Communication.

1. INTRODUCTION

In today's rapidly evolving urban landscape, efficient waste management is more crucial than ever. Enter the IoT-based smart dustbin and management system – a cutting-edge solution leveraging Internet of Things (IoT) technology to revolutionize waste collection and monitoring. By integrating advanced sensors and communication modules, these systems enable real-time monitoring, optimized waste segregation, and streamlined collection routes. With automated lid operations and data-driven insights, they empower cities to proactively manage waste, minimize environmental impact, and enhance urban cleanliness.

1.1 OBJECTIVE

This system is developed using Arduino, ultrasonic sensor, and IOT module . It offers several benefits to the users such as Protect from bacteria and germs- motion sensor trash can protect you from harmful bacteria and germs and gives hygiene surroundings. Because of sensor technology, there is no need to touch the trash can for opening or closing.

2. EXISTING SYSTEM

In existing methods in the literature are still too complex which demand high computational processing to solve the e-waste.And it involves Manual waste collection which need an much manpower to separate the wastes.This system assured the cleaning of dustbins in a short time when the garbage level reached its peak level. If the dustbin was not cleaned at a specific time, then the records were sent to the higher authorities who took appropriate action against the garbage collector.

This system also helped to monitor the fake reports and helped to reduce the corruption. It ultimately helped to keep cleanliness in the society and Homes.

2.1 DISADVNTAGES

- Manual operation makes it less accurate.
- Make more pollutant and poisoning gases.
- It creates unhygienic conditions for people as well as ugliness to that place leaving bad smell.

3. PROPOSED SYSTEM

To propose a smart waste management system on the basis of the level of waste present in the dustbin. This system offers real time monitoring of bin status data from two sensing hardware systems . The hardware components we used to fix in the bin are ultrasonic sensor which is used to check the level of the waste present in the bin. the weight sensor which is used to check the weight of the wet waste present in the bins. It's had automatic open and close system is include And Each and every bin has a sensor which wills sense the dustbin is full or not i.e. the level of waste present in the bin. Most of the time even if the dustbin is not filled it start stinking which may result to pungent smell in the locality to prevent this situation, we used moisture sensor fixed in the dustbin, the information is sent to the waste management center.

3.1 ADVANTAGES

- This reduces human time and effort, cost and which results in a healthy environment.
- .Direct intimation to the user or city corporation via-SMS.
- The accuracy of the system is high compared with manual work**.**

4. SYSTEM ARCHITECTURE

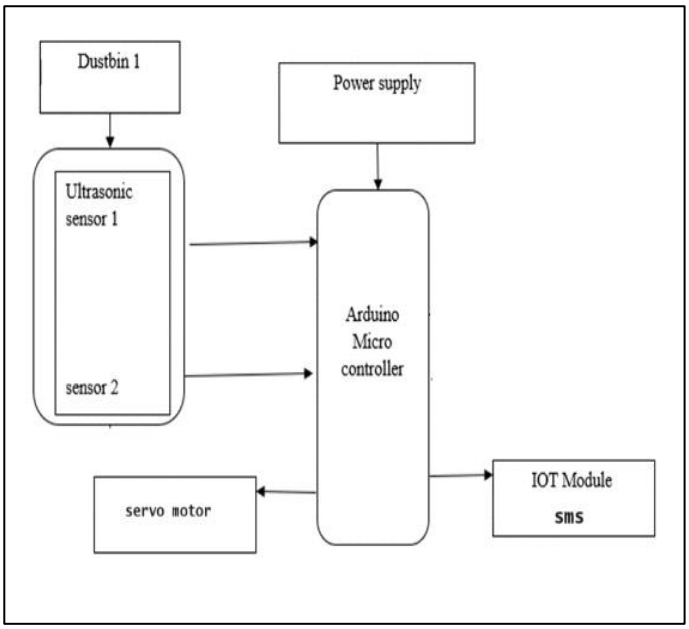

Fig 4.1 Block Diagram

5. HARDWARE DESCRIPTION

In an IoT-based smart dustbin and management system, the hardware components play a crucial role in enabling efficient waste collection and monitoring. Here's a description of the key hardware components typically found in such systems:

5.1 MICROCONTROLLER

The heart of the system, the microcontroller manages data processing, sensor interfacing, and overall system control. It executes the programmed logic for waste detection, lid operation, and communication with other components.

5.2 SENSORS

Various sensors are employed for waste detection and environmental monitoring. These may include:

- Infrared (IR) sensors: Detect presence and proximity of objects, useful for monitoring

waste levels and detecting motion near the dustbin.

- Ultrasonic sensors: Measure distances accurately, allowing for precise estimation of waste levels within the bin.
- Moisture sensors: Detect moisture content in waste, aiding in distinguishing between wet and dry waste.

5.2 COMMUNICATION MODULE

Facilitates communication between the smart dustbin and external systems such as servers, mobile applications, or other IoT devices. Common communication modules include:

- Wi-Fi: Enables wireless connectivity for data transmission to servers or cloud platforms.

5.3 ACTUATORS

Mechanisms responsible for physical actions within the smart dustbin, such as:

- Lid actuators: Control the opening and closing of the dustbin lid based on sensor inputs or user commands.

5.4 POWER SUPPLY

Provides electrical power to all components of the system. Depending on the application and location, power sources may include:

- Battery: Suitable for mobile or remote deployments where access to mains power is limited.
- Mains Power: Utilized in fixed installations with readily available electrical outlets.

5.5 PROCESSING UNIT

Handles data processing tasks and interfaces with external systems which may help in a Classification process in an waste management system.

By integrating these hardware components effectively, an IoT-based smart dustbin and management system can accurately monitor waste levels, optimize waste collection routes, and contribute to efficient waste management practices in smart cities and urban environments.

6. OUTPUT

7. CONCLUSION

In this project the implementation of smart dustbin management system using IOT as a hardware and ionic framework as our software ensures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority in our case the admin who can take appropriate action against the concerned employee. In our project we are only using a IOT that will notify the assigned employee regarding the value of the dustbin. But in the dustbins not only notify about their values but also share the predefined locations so that it becomes easy to find those dustbins and empty them.

8. REFERENCES

[1] F. Ingelrest, G. Barrenetxea, G. Schaefer, M. Vetterli, O. Couach, and M. Parlange, "Sensorscope: Applicationspecific sensor network for environmental monitoring," ACM Trans. on Sensor Networks (TOSN), vol. 6, no. 2, 2010.

[2] C. K. M. Lee and T. Wu, "Design and development waste management system in Hong Kong," in Proc. IEEE Int. Conf. IEEM, 2014.

[3] M. S. Islam, M. A. Hannan, H. Basri, A. Hussain, and M. Arebey, "Solid waste bin detection and classification using dynamic time warping and MLP classifier," Waste Manage., vol. 34, no. 2, pp. 281–290, Feb. 2014.

[4] V. C. Hemmelmayr, K. F. Doerner, and R. F. Hartl "Models and algorithms for the integrated planning of bin allocation and vehicle routing in solid waste management," Transp. Sci., vol. 48, no. 1, Feb. 2014.

[5] B. Tang, Z. Chen, G. Hefferman, T. Wei, H. He, and Q.Yang, "Incorporating Intelligence in Fog Computing for Big Data Analysis in Smart Cities," IEEE Transactions on Industrial Informatics, vol. 13, no. 5, 2017.