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Survey on Smart Bin Using IoT

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Abstract: ***Through this project we are trying to prepare the model of a garbage bin in which according to the planning it should detect the garbage and slide the flip of the garbage bin. In this project we have planned to make use of sensors through which the garbage can be detected and accordingly the flip can be slide. Here through this project, we have planned to module the project on the basis of different kind of garbage being usually disposed. In this project the garbage bin is being divided into the basic two types of waste i.e., dry waste and wet waste. Here the sensors will detect not only the garbage but also which kind of garbage is being present there and accordingly open the flip and allow to through the garbage in the bin accordingly.***
Keywords: Arduino Uno, IR Sensor, Rain Senser, Bluetooth, Ultrasonic Sensor, Motor.

I. INTRODUCTION

In the modern world, proper waste disposal is a major concern. The environment has suffered as a result of the way that a large volume of created waste was disposed of. Waste is frequently disposed of by unplanned open dumping at municipally constructed landfill sites. As a result of this strategy, human health, plant life, and animal life are all impacted. Surface and groundwater are contaminated by the toxic chemicals produced by the waste disposal procedure.

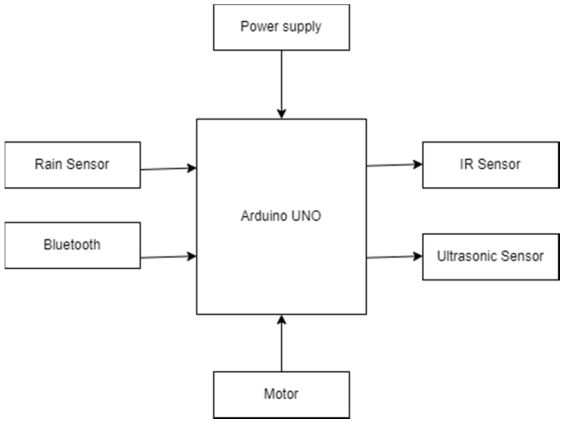


Fig. 1 Block Diagram

II. LITERATURE REVIEW

In " SGBS: A novel smart garbage bin system for understanding household garbage disposal behaviour", Eunice Likotiko; Shinya Misaki; Yuki Matsuda; Keiichi Yasumoto [1] proposed that the adoption of intelligent of intelligent trash management systems has increased recently. There is a chance to provide a dynamic garbage collection and predict future rubbish increase thanks to prior work on IoT garbage management systems. Nevertheless, there hasn't been much focus on studying how people utilise trash disposal systems or the kinds of rubbish that families create and dispose of. In order to investigate, we created the "SGBS" smart trash bin system, which can track garbage quantities and identify the components of rubbish disposed of. ToF (time of flight), DHT22 (temperature and humidity), load cell, and air quality sensors were attached to the smart trash can to measure the amount of rubbish. Users in households entered the sort of rubbish they disposed of using cell phones that had an application installed for garbage annotation. Data was sent into a cloud server via a gateway that was a sigfox antenna module. The created system makes use of sleep and waking cycles together with energy-saving algorithms to cut down on energy consumption and lengthen the lifespan of sensor devices in regular operation. We ran a preliminary trial on the smart waste bin system in three homes to assess our strategy. Our research demonstrates that how households dispose of their waste is influenced by the quantity, composition, and frequency of their garbage disposal activities. We talk about how scaling out our system in a smart city might lead to a shift in behaviour, healthier living conditions, and increased operational effectiveness in waste collection.

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In "Garbage Zero (Garb0): An IoT Framework for Effective Garbage Management in Smart Cities", Sagar Chavan; Umesh Patil; Santosh Sam Koshy; S.V. Srikanth [2] proposed that combining efficient waste management techniques with low-cost, low-power Internet of Things (IoT) systems is a key current trend. This essay examines Garbage Zero (Garb0), a locally produced item designed for outdoor trash cans. The goal of Garb0 is to create a real-time, energy-efficient IoT-based solid waste monitoring solution that aids cities in streamlining their garbage collection and upholding a clean, green environment. For real-time fill level data, the Garb0 sensor module may be put inside public garbage cans. Using Low Power Wide Area Networks (LPWAN) based Long Range (LoRa) technology, the relevant data regarding the current fill level of the garbage bin will be transmitted to the cloud, where it will be processed and forwarded to the mobile application for the garbage collector and to the municipal dashboard for updating the status. Optimal schedule and route for collecting the rubbish from the garbage bins will be produced on the garbage collector's app and consequently tells the driver to follow the most efficient path. The major focus of this article is on the hardware and software design used to achieve cheap cost, low power consumption and long battery life.

In "Research on the Design of Household Intelligent Sorting Garbage Bins Based on Raspberry Pi", Aiqin Lin [3] proposed that due to the standard residential garbage bins' inability to distinguish between recyclable and non-recyclable waste, a design approach for smart garbage bins based on the Raspberry Pi is suggested. An overall framework of the system is built using the Raspberry Pi, Arduino development board, and USB camera. The software and hardware design concepts of garbage bins in the implementation process are also explained, and the use of image recognition in garbage sorting is researched. The experiment shows that the system can function steadily and sort properly, reducing the resource waste of conventional garbage bins, accomplishing the goal of precisely detecting and sorting rubbish, and having a strong application possibility in garbage sorting.

In "Garbage Monitoring and Disposal System for Smart City Using Iot", Prasun Chowdhury; Rittika Sen; Dhruba Ray; Purushottam Roy; Souradeep Sarkar [4] proposed that India produces between 0.2 and 0.6 kg of waste per person every day. Furthermore, it is a well-known truth that land is limited in India. The trash hauler that visits our home each morning to empty our trash cans dumps all of the trash from our neighbourhood on an undeveloped plot of land. There, garbage collectors from all around the city gather to perform the same task. A landfill is a place like this. India produces so much rubbish per person that if the garbage collection skips a neighbourhood for a few days, a crisis emerges. We need to implement a smart system of garbage monitoring and disposal because the process is entirely manual. India produces between 0.2 and 0.6 kg of waste per person every day. Furthermore, it is a well-known truth that land is limited in India. The trash hauler that visits our home each morning to empty our trash cans dumps all of the trash from our neighbourhood on an undeveloped plot of land. There, garbage collectors from all around the city gather to perform the same task. A landfill is a place like this. India produces so much rubbish per person that if the garbage collection skips a neighbourhood for a few days, a crisis emerges. We need to implement a smart system of garbage monitoring and disposal because the process is entirely manual. In this study, an IoT-based strategy for waste monitoring and disposal employing ultrasonic and MQ4 sensors is proposed. The level of trash in the biodegradable and non-biodegradable "smart bins" is measured using an ultrasonic sensor. The amount of odour in the biodegradable trash bin is monitored using MQ4 sensors. Once the threshold level is passed in the non-biodegradable smart bin, the information is transmitted to the municipal corporation (with the assistance of an application) for the disposal of the rubbish. When the biodegradable bin's threshold level is reached, a lid slides, dumping the trash into the chamber below. This approach is a step towards a "smart city" and is more practical than the manual one. It guarantees effective rubbish removal and the restoration of a clean, healthy atmosphere.

In "IoT based Smart City Garbage Bin for Waste Management", E. Shanthini; V Sangeetha; M. Jagadeeswari; B Shivani; P Selvapriya; K Anindita; D Divya Shree; [5] proposed that one of the most difficult jobs in urban planning is waste disposal. Negligence is a major issue in waste management because it eventually leads to garbage cans being overfilled. The usual method of having garbage trucks pick up trash at regular intervals is quite inefficient since it leaves an imbalance in how rubbish should be cleared. Overflowing leftover rubbish poses a severe health and societal risk, contributing to issues including foul odours, the spread of illnesses, and even insect infestation. This study proposes a "IoT-based smart city rubbish bin" as a way to optimise and organise the problem. The Node MCU microcontroller, which has open wi-fi and water-resistant sensors attached on the bin lids to monitor the bin's status, is part of the smart garbage can. A mobile application is created for the system's user to make it easier for them to monitor rubbish effectively.

In "Location Based Garbage Management System with IoT for Smart City", Shashika Lokuliyana; Anuradha Jayakody; G.S.B. Dabarera; R.K.R. Ranaweera; P.G.D.M. Perera; [6] proposed that to provide a comfortable place for people to live, smart cities incorporate a variety of ICT and IOT solutions.

Offering a waste management system that is efficient, effective, and ecologically beneficial is one of these alternatives. The existing garbage collection system involves daily or weekly rounds of regular garbage trucks, which not only don't reach every part of the city but are also a wholly wasteful use of public funds. In this article, a cost-effective IOT-based system is suggested for the government to use in order to effectively manage the enormous volumes of rubbish that are collected every day, as well as to better address the inconvenience of garbage disposal for the populace. This is accomplished through a network of smart bins that uses cloud-based tools to monitor and analyse data received to provide prediction routes for trash trucks using algorithms. Both the workforce and the general public may use an android app that, for the workforce, generates routes and, for the general public, locates the closest smart bin.

In "Smart Garbage Management System", Parth Jajoo; Akshata Mishra; Sushmit Mehta; Vivek Solvande [7] proposed that the Swacch Bharat Abhiyan and Digital India campaigns of the Indian government aim to maintain the nation's infrastructure and make cities smarter. India's population is expanding quickly on a daily basis. The rubbish is likewise increasing at the same rate at the same time. As a result, it might be difficult to find a solution to the trash management issue. Every Indian citizen is aware of the procedure used to collect trash from society. In select areas, the Brihan Mumbai Municipal Corporation (BMC) occasionally fails to collect the trash. It could result in pollution, which brings about health problems and sickness. As a result, some of the key actions must be taken to address the problem of waste management. The current system collects trash in random ways. Consequently, occasionally, some regions are left unattended, which may result in an unpleasant odour and harm to the general public's health. In certain places, the scent of the rubbish might be deadly to some children. The suggested system explains how the current problem is fixed. The suggested approach keeps an eye on the trash can. When keeping an eye on the trash can, it notifies the appropriate party of the amount of waste that has been put in it. The next notice is sent to the higher authority if the lower authority rejects it. They will really be able to know where and when to go collect the trash thanks to the suggested technology. The suggested system controls the effort required to visit the place and investigate it. Due to periodic interactions between the Brihan Mumbai Municipal Corporation (BMC) and the suggested system, the proposed idea is extremely beneficial for both the BMC and the local residents. Hence, the suggested approach provides a superior means of managing waste.

In "IoT based smart garbage monitoring & collection system using WeMos & Ultrasonic sensors", Saadia Kulsoom Memon; Faisal Karim Shaikh; Naeem Ahmed Mahoto; Abdul Aziz Memon [8] proposed that the amount of rubbish, particularly domestic plastic waste, has skyrocketed in the twenty-first century, endangering not just the human species but also the ecosystem. So, finding a planned and coordinated method to deal with this issue is urgently needed. As a result, the globe is moving towards smart systems to have the most effective framework in dealing with everyday rubbish because it makes up a significant portion of urban waste and significantly worsens environmental issues. As a result, smart cities with smart waste management systems may represent a positive step. Smart cities are a collection of various Internet of Things (IoT) solutions that enhance human life in every way by making it more pleasant and safe. The efficient management of waste is one of the applications of IoT that would guarantee a healthy environment for life on this green planet. The goal of this research is to create an Internet of Things (IoT) based, cost-effective system that can track regular trash in real time while utilising WeMos and Ultrasonic sensors, which eat up the minimal resources of the waste management authority. Findings confirm precise real-time monitoring of trash in trash cans.

In "Intelligent Waste Management for Smart Cities", Nimisha Mittal; Priyanjali Pratap Singh; Prerna Sharma [9] proposed that with the rapid advancement of technology, the emphasis has switched to a green economy that emphasises sustainability, recycling, and reuse. The core of a smart waste management system is a smart garbage collection, and whatever step taken to create an Integrated Platform for Waste Management would be centred on an intelligent bin. This study introduces an Internet of Things (IoT)-based smart trash can that can fit into both the modern world and the needs of upcoming smart cities. In addition to collection and transfer, the suggested implementation offers an end-to-end scalable solution for disposal. In addition to detecting the level of the bin, the smart bin can also detect odours and fires inside the bin, ensure bin safety, take into account the container's weight capacity, and offer a non-touch interface for disposal to maintain hygiene. The suggested solution eliminates the annoyances of spilled trash cans, poorly kept trash cans, and irregular and disorganised pickup. Insightful data is gathered to make future endeavours easier. The paper also makes an effort to point out some of the current obstacles to creating and implementing sustainable development plans.

In "Smart Garbage Monitoring System Using AVR Microcontroller", Smita S. Pawar; Shivani Pise; Kranti Walke; Renuka Mohite [10] proposed that together with the rapid population expansion and pollution, rubbish management has become a dangerous issue in developing nations during the past few decades. Similar to other developing nations, India has neglected rubbish management in many locations; as a result, a workable solution is required.

Overflowing trash cans are not promptly removed from most regions, resulting in a disease-ridden environment and weak nations. Garbage collection in bins is subject to daily variations in both quantity and timing. Municipal Corporation's fixed-schedule waste collection vans are becoming less reliable, and their collection process is unmonitored. The typical approach uses more gasoline and takes longer in the current situation.

III. CONCLUSION

The load on the local authorities can be lessened by implementing this system at the local level in places like society, educational institutions, etc. The automatic garbage segregator is a minor step towards creating a productive and affordable waste collection system with little to no risk to human life and little to no human interaction.

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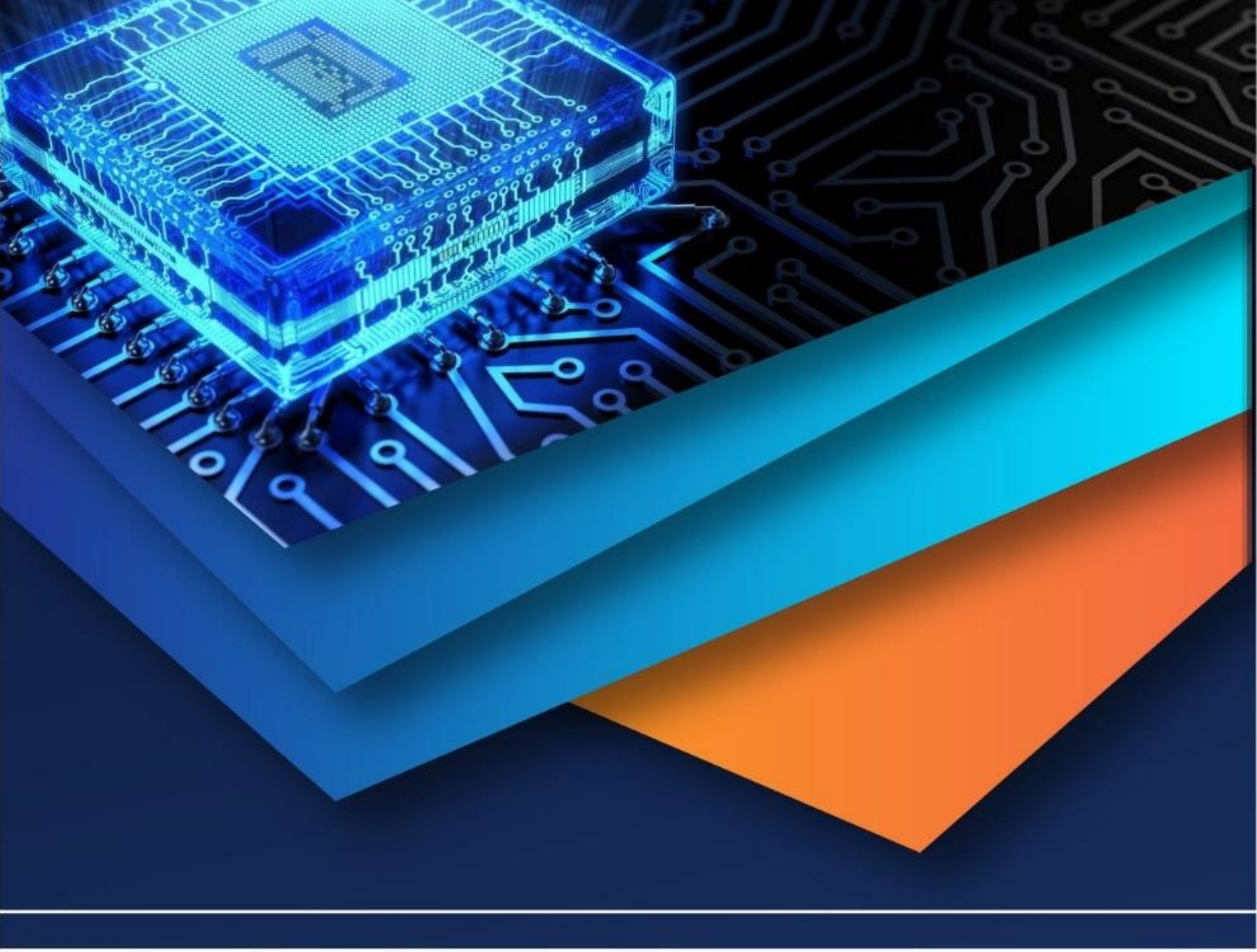
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