SMART WASTE MANAGEMENT SYSTEM FOR METROPOLITAN CITIES

INTRODUCTION

Solid trash is becoming major threat to our emerging nations. Recent population growth and rural-urban migration may be to blame for this rise. Non-renewable materials that we use every day to suit our requirements and subsequently discard make up garbage. Garbage production increases dramatically along with growth in the usage of paper, textiles, bottles, and product packaging. The form and kind of solid waste relies on a variety of variables, including the level of living and way of life of the local populace as well as the local natural resources. Urban garbage is divided into two categories: organic waste and inorganic waste. Three further categories of organic waste exist: nonfermentable, fermentable, and putrescible.A common illustration is the overflowing garbage cans that are seen throughout, which cause pollution of the environment. As a result, there are more infections since there is space for insects to breed. Regardless of substance, origin, or potential hazards, solid waste needs to be managed systematically in order to maintain a high standard of living and environmental best practises. It is vital to include solid waste management in environmental planning because it is a crucial component of our environmental hygiene. Recent developments in computing have spawned fresh ideas and opportunities, such as the Internet of Things, which allows things (embedded systems) connected to the internet to be controlled and interacted with online.In 1999, Kevin Ashton, a former head of MIT's Auto-ID Center, coined the phrase "Internet of Things" (IoTs) . IoTs aim to connect the surrounding things via wired and wireless networks with the help of people. The object engages in communication and information sharing in order to offer users an advanced, intelligent service. When it comes to the suggested solid waste management system, the bins are linked to the internet to transmit real-time information about the bin status. In order to prevent living conditions that are unclean, the recent rapid expansion in population has resulted in a greater amount of trash disposals. When the system is put into use, the bin is connected to a microcontroller-based system that has ultrasonic sensors and a Wi-Fi module. The data would be received,

analysed, and processed in the ThingSpeak cloud, which shows the amount of trash in the bin on a graph on its website. The primary motivation for solid waste management is the mitigation and eradication of waste materials' detrimental effects on the environment and human health, which ultimately improves quality of life. As cloud computing has been used in other fields like, this is a newer breakthrough. To determine how full each container is with solid trash, ultrasonic sensors are used. The sensor's data is subsequently sent through a Wi-Fi communication link to an IoT cloud platform called ThingSpeak. The system sends the proper notification message (in the form of a tweet) for each set fill level to inform the essential authorities and the concerned citizen(s) to take the needed action. Additionally, the fill level is continuously observed on ThingSpeak.

OBJECTIVE

Solid waste disposal without consideration is a significant problem in the urban areas of the majority of developing nations, and it seriously jeopardises the residents' ability to live a healthy lifestyle. Both the local government and the residents will benefit from having access to trustworthy data on the state of solid trash at various points throughout the city for managing the threat. In this study, the Internet of Things (IoT) and cloud computing technologies are used to create an intelligent solid waste monitoring system. Ultrasonic sensors are used to measure the solid waste fill levels in each of the containers, which are placed in strategic locations around the community. The sensor data is sent over a Wireless Fidelity (Wi-Fi) communication channel to the ThingSpeak IoT cloud platform. The system sends the required notification message (in the form of a tweet) to inform the proper authorities and the concerned citizen(s) of the need for action based on the fill level. Additionally, the fill level is continuously observed on ThingSpeak. The system's performance demonstrates that the suggested method can be helpful for effective trash management in connected and smart communities.

LITERATURE SURVEY:

The ever-growing network is referred to as the "Internet of Things" (IoT).The number of internet-connected gadgets in use globally today. In spite of the increasing Internet of Things sector, the current Covid-19 pandemic, and it is estimated the number of IoT connections will reach 30 billion by the year 2025[1].The enabling technologies that hasten the creation and implementation of domain-specific IoT systems include advanced smart sensors, cloud computing, big data, lightweight communication protocols, open-source server software, and web development tools[2].The physical and digital worlds can be more seamlessly connected by these interconnected gadgets, advancing productivity, culture, and quality of life. Smart Homes, Smart Cities, Agriculture, Wearables, Smart Grids, Industrial Internet Telehealth, and Smart Supply chain Management are just a few of the domain-specific applications for which IoT has already demonstrated viable techniques[3].Beginning with waste that is created by city dwellers and dumped in trash cans as soon as it is created, the traditional waste management process begins. Municipal department trucks collect the trash and deliver it to the recycling facilities according to a set schedule. Municipalities and businesses find it difficult to keep track of the outdoor bins, such as when to clean them or whether they are fully or partially filled. The management of these wastes through prevention, tracking, and treatment is one of the most urgent concerns of our time[4].2.01 billion tonnes of urban solid garbage are produced globally each year, 33% of which are not treated in an environmentally responsible manner. Global trash is predicted to exceed 3.40 billion tonnes by 2050, more than double the rate of population growth during that time[5].With today's technology, it is no longer necessary to manually inspect waste in bins, which is a time-consuming process that costs more in terms of labour, money, and time[6].To solve the aforementioned shortcomings of traditional waste management systems, a number of WSNand IoT-based remote monitoring systems have been created and implemented[7].Some of the monitoring systems used short-range wireless networking technologies like Bluetooth, Infrared, ZigBee, and Wi-Fi to track the bins[8].Due to the benefits of IoT services, researchers have conducted a number of waste management studies centred on IoT technologies to address the aforementioned problems with solid waste management. The necessity of using waste management techniques and sustainability principles is increased by the fact that certain businesses, such as those in the construction and food processing sectors, constantly create a part of garbage with

noticeable residue[9].A few studies have also discussed smart bin monitoring systems that use NB-IoT, Sigfox, and LoRa wide area networks[10].

CONCLUSION

From this review we conclude that best way to implement this project **Smart waste management system for metropolitan cities** is mobile application, sensors, intelligent monitoring system.

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