ISSN (Online): 2455-3662
EPRA International Journal of Multidisciplinary Research (IJMR) - Peer Reviewed Journal
Volume: 9| Issue: 8| August 2023|| Journal DOI: 10.36713/epra2013 || SJIF Impact Factor 2023: 8.224 || ISI Value: 1.188

AN IoT BASED AUTOMATIC WASTE SEGREGATION

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ABSTRACT

The purpose of this system's development is to overcome obstacles and provide a chance for waste management and segregation system upgrades. The Automatic Waste Management and Segregation System makes use of the Internet of Things, with the suggested system being installed across cities and having an embedded system to separate and keep track of the bin's level. In order to evacuate the bins, the status of the bins is sent to the relevant authorities, and the locations of the bins are found online. This method minimizes human involvement, contact, and time and resource consumption.

KEY WORDS- Dry wet sensor, IR sensor, MQ sensor, Arduino Uno, Node MCU, Bin.

I.INTRODUCTION

The trash generated in India today presents a number of environmental difficulties, including poor waste collection, treatment, transport, and disposal. The entire challenge, from conception to disposal, is the most challenging. Our nation cannot exist under the current system, which leads to damage of the environment and public health, because of the growing urban population. garbage can be liquid or solid, and each sort of garbage has a unique way of being disposed of. Human welfare will be threatened by waste. To live a healthy lifestyle, proper waste management is essential and crucial. If the dustbins are often flooded, an unsanitary environment will be produced. Separating dry and moist trash is a crucial part of waste segregation. Waste segregation lowers the amount of waste dumped in landfills and lowers pollution of the air and water. Compared to mixed waste, it is simpler to dispose of waste that has been separated.

This program aids in the management and classification of garbage. Dustbins are positioned across the city; they are delivered with a low-cost embedded mechanism to help with rubbish bin tracking. When the trash can is fully loaded, an SMS text message is delivered to the municipal corporation. When the state of the bin is made known via the Internet, the relevant authorities will then take immediate action. The ultrasonic sensors, node MUC, and servo motor used to construct the suggested system.

II. LITERATURE SURVEY

The "IoT based Waste Management for Smart Cities" is introduced by Padmakshi Venkateshwara Rao and Pathan Mahammed Abdul Azeez in 2020[1] to address environmental concerns such insufficient garbage collection, treatment, and disposal. Dustbins are put across the city because flooding in them creates unsanitary conditions; The "Blynk app" is utilized to receive the quick SMS as soon as the waste bin reaches its peak value since it is delivered with a low-cost embedded technique to aid in tracking the garbage. As a result, as soon as the status of a bin is informed via the internet, the alert authorities will take immediate action. The proposed system is created using a servo motor, an ultrasonic sensor, a node MCU, and a blynk app. Urban garbage increases as long as modern lifestyles increase, according to Nikolaos Baras and Dimitris Ziouzios's introduction of "A cloud-based smart recycling bin for in-house waste classification" in 2020[2]. The greatest approach to produce a sustainable ecosystem is through recycling, which also necessitates segregating waste, which is a laborious and time-consuming operation. It is an efficient smart recycling bin with a low cost that makes use of the cloud's power to classify waste for each household use. Smart trash cans have sensors that collect data, and artificial intelligence and neural networks can be used to classify the rubbish inside each one. And it has a classification accuracy of 93.4% for various waste categories. Sanket Salvi and Shashank Shetty, 2020[3] This presents the SAF-Sutra, which is described as "A Prototype of Remote Smart Waste Segregation and Garbage Level Monitoring System" that can be remotely monitored for a very low price. The portability and simplicity of component assembly are taken into account in the design of the proposed system as crucial implementation elements. The system's interaction with the user while using a mobile device and a web application is demonstrated in the demonstration. Dr. Elena v. Rosca, a Clude-Noel Tamakloe, introduces the Smart System and the Internet of Things (IoT) for trash management to give an effective and efficient means of disposing of waste and to enhance city waste management. The suggested system is depicted as a prototype of a small, intelligent trash can that is powered by solar energy and is monitored by server-side software. The intelligent trash can can monitor the level of interior trash, compress it, and free up 25% of space with each compacting. The bin may send all the information to a secure server side application while also detecting and monitoring the entire weight. To maintain tourist attractions, Rania Rizki Arinta and Dominikus Boli Watomakin create "Improves Smart Waste Management" in 2020[5]. The primary goal of Yogyakarta in an IoT setting is to recycle garbage because not

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doing so will make the breakdown process more laborious. As a result, the dustbin and smartphone are connected, and an ultrasonic sensor is used to determine the trash can's capacity. The sensor may transfer data through the wi-fi module through smartphone when the dustbin and wi-fi module are used together. Chethan Kaushal and Anshu Singha introduce the Architecture for Garbage Monitoring Systems Using Integrated Technology in 2020[6]. They developed a revolutionary trash management architecture that makes use of the Internet of Things and digital image processing. monitor the excessive rubbish flow and inform the appropriate authorities to take the necessary measures.

III. METHODS

The two bins in this suggested system were used to store dry and wet garbage, and they can be swapped out for cleaner ones. On the dry-wet sensor, garbage is deposited. A threshold of moisture is set for the drywet sensor. This detects the amount of moisture, and the relay enables the servo motor to rotate in both clockwise and counterclockwise directions, moving waste into the appropriate bins. The IR sensors are used to inform the municipality and determine the level of waste in the bin. The MQ sensor is used to measure the concentration and smell of various gases.

The node MCU is used to send all of the sensed data from the Arduino UNO's sensors to the cloud. Embedded C would be used to code the software. As a result, users will see messages on the LCD, and the obtained status will be communicated to authorized parties using the MQTT protocol for sending bin status.

The project's flow is shown in the image below, where we first initialize the library functions, declare the pins, and assign the sensors' pre-set values.

The procedure will stop if the button is not touched, thus we must determine whether it is pressed before moving on. The device will determine the amount of moisture in the trash before classifying it as either dry or wet depending on previously defined parameters. When the trash can is full, a message notifying the department to collect the trash is sent, and the trash can is subsequently emptied. The method repeats again if not

IV. WORKING PRINCIPLE

- There are two containers for waste storage in our suggested arrangement. The trash must first be set on the dry-wet moisture sensor.
- Using the medium's dielectric permittivity, which is a function of water content, it detects the moisture content of trash. The user may then see on the LCD whether the trash has been identified as dry or moist depending on a previously selected threshold value.
- The wastes are transferred into the appropriate bins using a servo motor and relay. Both bins include IR sensors that measure how much trash is present within.
- If the bins are full, notifications are sent to the municipality instructing it to remove the bin as soon as possible.
- The odor and combustion in wet and dry bins are checked using the MQ sensor and flame sensors, respectively.
- Based on the concentration of the gases present, the device notifies the municipality if any odor or combustible material is found.

As a result, the MQTT protocol is used to send bin status information to the cloud, where the municipality may access it.

V. RESULTS AND DISCUSSION

- This project, which will be able to separate the dry and moist waste, may be utilized in daily life.
- The municipality is informed of the state of the bin by this system, which also monitors it.
- It allows for wireless data transfer and allows for anytime, anywhere access to its data. • It prevents bin overflow, which lowers environmental pollution and health risks.

The suggested approach may be applied everywhere in metropolitan areas that are pollution-free and have a welcoming environment that promotes healthy, risk-free living. By preventing the overflow of trash cans, it protects lives without endangering them.

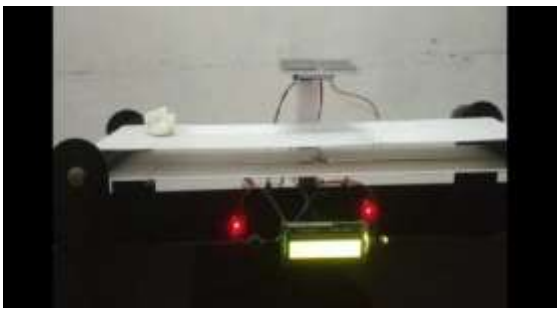

Fig.2.Proposed system

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Fig.3.,Message Displayed

VI.CONCLUSION

This study applies a "Automatic waste management and segregation system using IOT" to improve the cleanliness of smart cities. Waste disposal is a serious challenge due to urbanization and population growth.The suggested method effectively separates dry and moist garbage without the need for human interaction or interference. It offers prompt collection and elimination. The suggested method can be set up domestically in a home or extensively in public areas.

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