IOT BASED AUTOMATED WASTE SEGREGATION SYSTEM

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ABSTRACT

Waste Management and segregation is a much-needed process in metro cities and urban areas due to spreading of diseases. It is estimated that India produces 42.0 million tons of municipal solid waste annually at present. Waste lying littered in the surrounding, dumped on open lands, becomes a major problem for various types of disease-causing bacteria and viruses hence, segregation, transport, handling and disposal of waste must be managed properly to minimise the risks of the public and environment. When mixed dry and wet waste breaks down in lowland, it creates nasty greenhouse gases. Segregation makes it attainable to utilise and recycle the waste effectively.
This waste segregator system can easily segregate waste. When waste is thrown in the pipe, the IR sensor will sense the waste. Waste is divided into three categories namely Wet, Dry and Metallic. Another sensor will sense the garbage category. As per the algorithm used, if the waste is metallic then the mechanism will bring the metal collecting bin below the pipe and with the help of a servo motor the waste will fall into the metal bin. Similarly, the process will repeat if wet waste is sensed. If the sensor doesn't activate the sensor category, then the waste will be considered to be a dry waste. Segregation system for household use, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste.

I. INTRODUCTION

The Automatic Waste Segregation System utilizes sensors and other advanced technologies to identify different types of waste and separate them into their respective categories. This system has numerous benefits, including reducing the amount of waste that ends up in landfills, increasing the amount of waste that can be recycled, reducing the need for manual labor, and improving the overall efficiency of waste management processes.

In this era of increasing concern for the environment, an Automatic Waste Segregation System has become an essential tool for sustainable waste management. With the ability to process large quantities of waste quickly and efficiently, this technology has the potential to revolutionize the way we manage our waste and help us move towards a more sustainable future. time-consuming, labor-intensive, and often result in the improper disposal of waste.

Automated waste segregation systems are becoming increasingly popular in many parts of the world, as they offer a more efficient and cost-effective way to manage waste materials. By using automation, the system can reduce the need for manual sorting, which can be time-consuming, costly, and error-prone. Additionally, automated waste segregation systems can help to minimize the environmental impact of waste disposal, by ensuring that recyclable materials are properly sorted and recycled, and that non-recyclable waste is disposed of in the most appropriate manner.

II. LITERATURE SURVEY

In [1] Rapid increase in volume and types of solid and hazardous waste due to continuous economic growth. It is estimated that in 2005-06 the total amount of municipal solid waste generated globally reached 2.02 billion tones, representing a 7% annual increase since 2003. This paper proposes an Automated Waste Segregator (AWS) which is a cheap as well as easy to use solution for a segregation system for household use, so that it can be sent directly for processing. It is designed to sort the refuse into dry and wet waste. The AWS employs capacitive sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into wet and dry waste has been successfully implemented using the AWS.

In [2] Waste management, both indoor and outdoor, is almost done manually. This is unhygienic, and requires a significant amount of valuable human resources to get it done. Outdoor waste management is automated to an extent. Therefore, a proposal to fully automate indoor

waste management, by making the existing disposal outlets more intelligent and using a movable waste collecting robot, is discussed in this paper. The filling of the dustbin is monitored by ultrasonic sensors and if it is filled to the brim, the Arduino Nano controller transmits the data to the robot with the aid of wireless Zig bee 802.15.4 protocol. The robot is designed in such a way that it effectively tracks the location of the filled dustbin and collects the waste in its storage part. In comparison with the existing systems, the proposed system exhibits appreciable efficiency in power consumption and making it an ideal candidate for waste management.

An Automated Waste Control Management System (AWCMS) using Arduino [3], proposed by Agha Muhammad Furqan Durrani. In this work, when the bin gets completely filled the signal received by the IR sensor reduces and it sends a signal to the microcontroller which locates the position of the bin using GPS and sends alert SMS with location to a central unit that is connected to the UI software.

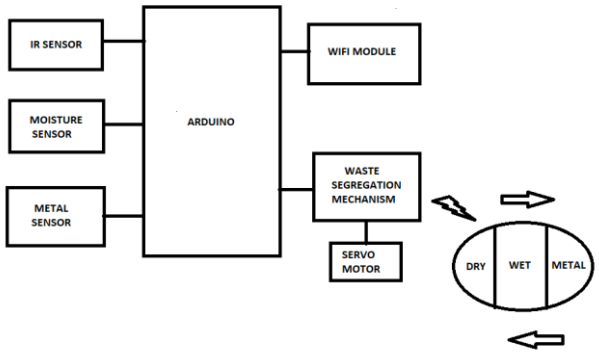
In [4] This research aimed to design and develop an autonomous robot to feasibly address waste disposal issues in common indoor places. The researchers found a path to improve plan by using Fuzzy Logic Control (FLC). And also, they utilized the Microcontroller unit to control sound, input proximity and IR sensors, and output geared DC motors through machine learning and electromechanical interface. They simulated an adaptive algorithm using Mamdani-type FLC model, implemented this algorithm using C programming language, then downloaded as machine code to a real prototype. Based on test results, the waste robot accurately detects human involvement, a feature that would be pivotal in overcoming individual indifferences on waste management. This research chronicled how a waste management robot prototype was designed and developed as feasible solution to address waste disposal issues in strategic locations such as households, offices.

In [5] An Automated Waste Control Management System (AWCMS) has been designed which includes an electronic waste detection device and a central control unit. An infrared sensor is used for sensing waste levels, GPS is used for location identification, Arduino Board having a microcontroller and GSM Module is used for sending the message which contains the information regarding the status of the bin. The central control unit consists of a receiving device which receives a message through GSM Module and sends it to the computer software using Arduino Board's microcontroller. The software has a proficiently designed GUI which helps the user to perform and monitor all the required actions for waste monitoring and detection of waste bins placed in an area or a city. All the information is displayed in the GUI of the software in the event of a waste bin getting full and then being emptied by municipal waste trucks or field workers. So that all the components in this entire system work in an efficient manner to make waste management automation possible so the waste is collected and disposed to the landfill at proper time.

III. METHOD AND MATERIALS

METHODS

The Main bin is divided into three compartments. Each Compartment has their own function, the first compartment Consists of an IR sensor and a metal detector and the second Compartment consists of another IR sensor and moisture Sensor for detecting dry and wet waste, the last compartment is subdivided into three bins for collection of the segregated Waste respectively. The whole system is controlled by a Microcontroller. Each and every component is interfaced to the microcontroller board. The necessary code for controlling the sensors and the motors is coded using embedded-C language, in which the inputs and the output ports can be defined easily. In this project we have used an IDE compiler to compile the code and upload it to the board using an A-B wire. To provide details of every decision we have used a Liquid Crystal Display device to display the decisions made by the arduino processor.



MATERIALS

HARDWARE

1.Arduino
2.IRSensor
3.MetalSensor
4.Moisture Sensor,
5.Liquid Crystal Display
6.Power Supply
7.Metal Stand.

SOFTWARE

1.Arduino IDE.
2.C Programming.

IV. RESULTS AND DISCUSSION

Automated waste segregation systems have the potential to bring about several positive outcomes. Some of these expected outcomes include:

1. Improved recycling rates: Automated waste segregation systems can accurately sort different types of waste materials, including recyclable materials such as plastics, glass, and metals.
2. Increased efficiency: The use of automated waste segregation systems can increase the efficiency of waste management processes by reducing the need for manual sorting.
3. Reduced environmental impact: By ensuring that waste materials are properly sorted and recycled, automated waste segregation systems can help to reduce the environmental impact of waste disposal.
4. Improved safety: The use of automated waste segregation systems can help to improve the safety of waste management processes by reducing the need for manual handling of waste materials.
5. Enhanced data collection: Automated waste segregation systems can collect data on the types and quantities of waste materials being generated.

V. CONCLUSION

In conclusion, automated waste segregation systems have the potential to improve recycling rates, increase efficiency, reduce environmental impact, improve safety, and enhance data collection. By using advanced machinery and sensors, these systems offer a more accurate and cost-effective way to manage waste materials, leading to a cleaner and healthier environment.

VI. REFERENCES

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