

Garbage Sorting Machine Using IOT

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ABSTRACT: Many times, in our city we see that the garbage bins or dustbins placed at public places are overloaded. It creates unhygienic conditions for people as well as ugliness to that place leaving foul smell. To avoid such situations we aim to implementing a IoT Based Smart Garbage and Waste Collection bins. In this work project presents a cost-effective design of an intelligent waste container for small-scale purposes. This system is based on Peripheral Interface Microcontroller(PIC), RFID, Bluetooth module and an IR sensor to monitor the fullness level of the container and give SMS alerts. The software part contains a web application, where the customer can purchase product using the coin(point) that was credited when dumping the waste. The main threat faced by the corporation part is in the separation of organic and plastic waste. Here we are using two basket for plastic and organic waste. For each disposal of waste the user can open the basket using RFID card, the coin is credited to his account. The website contains only paper products which also aims for the promotion of man who live by making different products using paper. Bluetooth module will help to send the count of waste that was read by the RFID to android device placed near by the system which is in wireless connection with system which contain database. The data will save to the database.

KEYWORDS: RFID, IR Sensor, Peripheral Interface Micro-controller(PIC)

I. INTRODUCTION

Environmental problems are raised by modern cities for waste collection and disposal. Therefore, smart waste management systems became essential for cities that aim to reduce cost and manage resources and time. Currently, the trend is shifting towards smart devices and internet of things (IoT) solutions to overcome common problems such as waste management issues. Optimizing the process of trash collection is the main purpose of the smart solutions provided by industry. However, the cost of applying such solutions is still relatively high. The purpose of this work is to present a cost-effective smart trash bin for shopping malls and university campus. The literature review of this work is sited in the upcoming review section. Then methodology and methods section will explain the work of the system and all the hardware and software used in this work, besides the design of the smart trash bin. Finally, the results of tests will be discussed followed by conclusions and future work.

We have come with a concept of Radio Frequency Identification (RFID) based waste collection system using microcontroller. RFID cards are unique identities provided to every user of the smart garbage bin. Whenever such user swipes the unique ID, the RFID card reader attached on the waste management system transverse the unique ID to microcontroller. Accordingly after the depositing of waste, based on the count of the waste coin is credited to the use

account. For each user account there will be unique pass word and user name given by the user itself. By using the credited coins user can purchase items from the web page created by the admin. When the bin exceeds its capacity a message will go to the predefined emergency phone number from the android device. When the sanitary worker empty the bin, the system will resume its default state.

II. RELATED WORK

Investigating context factors in citizen participation strategies[7]:-

Trash cans are crucial to the rubbish collection procedure only on a fundamental level. However, the garbage that has accumulated in the bins has to be continuously inspected before being sent to the facilities for processing. This constant monitoring, transport, and processing approach helps with waste management. However, if garbage cans were placed in remote or inaccessible regions, it might be difficult to keep an eye on them. If these conditions remained over time, there would be overflow as the quantity of trash thrown in the bins increased beyond what could be contained. As a result, continuous garbage bin monitoring is necessary. In this research, an Internet of Things (IoT)-capable "Smart Garbage Bin" (SGB) is created. SGBs often feature ultrasonic sensors for detecting garbage levels as well as networking, connection, and data transfer information and communication devices.

A novel Pythagorean fuzzy combined compromise solution framework for the assessment of medical waste treatment technology[8]:-

When developing intelligent systems for managing waste in an environmental setting[1], the use of radio frequency identification, or RFID, and charge cell sensor technology can be used to lower waste management costs as well as to make the recognition and weight measurement of waste (such as garbage, recycling, and green waste), more automated and efficient. In this study, we provide a model for a real-time waste management system based on RFID and sensors. The automated garbage belonging, volume, and missing bins identification system (WIWSBIS), which makes use of RFID and sensors, employs the architecture.

The preservation of the environment and the general populace depends on the management of medical waste (MWM). Medical personnel have utilised a variety of medical waste treatment technologies (MWTTs) for MWM. This study considers a number of treatment technologies (TTs), includes the microwave, sterilisation, chemical sanitation, and reverse polymerization. Each TT is also assessed for social acceptability, environmental protection, total cost, and health hazards in addition to the technology and how it functions. The finest technology is finally chosen. The process of selecting the ideal TT may be seen as an MCDM (multi-criteria decision-making) problem due to the involvement of several factors. When picking the best choice based on several criteria, decision experts must examine both qualitative and quantitative judgements, which may be quite ambiguous and confusing. To solve this issue, a brand-new Pythagorean fuzzy-based decision-making method is developed. We provide a novel Pythagorean fuzzy combined compromise solution (PF-CoCoSo) framework to rank the solutions. The weighting method for the criteria is also created using brand-new Pythagorean fuzzy similarity metrics that we give. By contrasting the newly suggested similarity metrics with current measures, the value of the metrics is further shown. To demonstrate the utility and practicality of the proposed framework, a MWTT example is given. The study shows that the autoclaving technique is the best MWTT alternative. An study of sensitivity and comparative research are done in order to further highlight the effectiveness and accuracy of the suggested approach.

An Internet of Things based smart waste management system using LoRa and tensorflow deep learning model[9]:-

In an environmental context, RFID (radio frequency identification) and load the cell sensor technology are helpful[1] to lower expenses associated with waste management as well as for streamlining and automating the detection and measurement of weight of garbage (which includes garbage, recycling, and green waste) for the creation of intelligent waste management systems. In this study, we offer a model for a real-time waste management system based on RFID and sensors. The automated garbage place, amount, and absence dustbin identifying system (WIWSBIS), which makes use of RFID and sensors, employs the architecture.

The preservation of the natural world and the general populace depends on the management of medical waste (MWM). Healthcare workers have employed a variety of medical waste treatment devices (MWTTs) for MWM. This study considers a number of treatment technologies (TTs), include microwave, autoclaving, chemical disinfection, and reverse polymerization. Each TT is also assessed for social acceptability, environmental protection, total cost, and health hazards in addition to the technology and how it functions. The finest technology is finally chosen. The process



of selecting the optimal TT may be viewed as a multi-criteria decision-making (MCDM) problem because to the involvement of several factors. When picking the best choice based on several criteria, decision experts must examine both quantitative as well as qualitative judgements, which may be quite ambiguous and confusing. To solve this one issue, a brand-new Pythagorean fuzzy-based decision-making method is developed. We provide a novel Pythagorean fuzzy combined compromises solution (PF-CoCoSo) structure to rank the solutions. The weighting method for the criteria is also created using fresh Pythagorean fuzzy comparison metrics that we give. By contrasting the newly indicated similarity metrics with current measures, the value of the metrics is further shown. A MWTT selection example is provided to highlight the usefulness and practicality of the proposed framework. The study shows that the autoclaving technique is a superior MWTT alternative. An study of sensitivity and comparative research are done in order to further highlight the effectiveness and accuracy of the suggested approach.

The risky medical waste treatment (MWT) concept forms the basis of various advanced management systems. Treatment methods may be classified into the following three categories: (a) low-temperature methods (such as autoclaves and responds, and microwaves); (b) medium-temperature methods (such as inverse polymerization); and (c) high-temperature methods (such as air and pyrolytic incineration). Low heat methods are used to deal with infectious waste, but they cannot be used to deal with chemical in nature, pharmaceutical, or anatomical waste that hasn't already been treated (by shredding, for example). Medium heat is also used to treat pathological waste, including anatomical pieces, as well as the same rubbish that was processed utilising the low heat method.

A Vision-based Robotic Grasping System Using Deep Learning for Garbage Sorting[5]

In this work, a machine vision-based robotic garbage sorting system is suggested. The target objects are successfully located and placed by this system, which then employs someone who manipulates to precisely photograph the sorted objects against a complicated backdrop. The main issue that systems for machine vision are attempting to address is object detection in complicated backdrops. This study makes use of deep learning to accurately identify the target item against a complicated backdrop. We utilise the VGG-16 and Region Proposal Generation (RPN) methods for object identification and posture estimation to accurately capture the target item. The instrument completes the categorization and grabbing of the item by gathering information from the device's eye system concerning the geometrical central parameters and the tilt of the longest dimension of the target object. The results of a rubbish sorting experiment utilising containers as the test item demonstrate the efficiency of the suggested method's 1 vision method and manipulator control system.

In this research, we provide a novel posture estimation and object identification method based on deep neural network models. For object identification, the Region Proposal Network (RPN) and VGG-16 model [5] are optimised. By collecting data regarding the geometrical central values and the slant of the short side of the desired thing from the equipment's vision system, the instrument completes the classification and holding of the object to be captured. System of Sorting Garbage Using Deep Learning[5]

III.METHODOLOGY

The following figure 3.1 shows the System Architecture of the project:-



We have come with a concept of Radio Frequency Identification (RFID) based waste collection system using microcontroller. RFID cards are unique identities provided to every user of the smart garbage bin. A user swipes the unique ID, and the RFID card reader attached to the waste management system transmits the unique ID to a microcontroller. After that we could choose which type of waste are we depositing. If it is Plastic, the motor opens the bin for plastic. And if it is organic, the motor opens bin for organic.

After that each waste entering the bin will be counted and at the end, a stop button should be pressed. Then the count of waste will be added to the user's account. Each user account will have a unique password and user name given by the user. Also displayed on the display. And rewards can be provided by how many points they have after checking the server. When the bin exceeds capacity, a message will go to the predefined emergency phone number from the Android device. When the sanitary worker empties the bin, the system will resume default functionality.

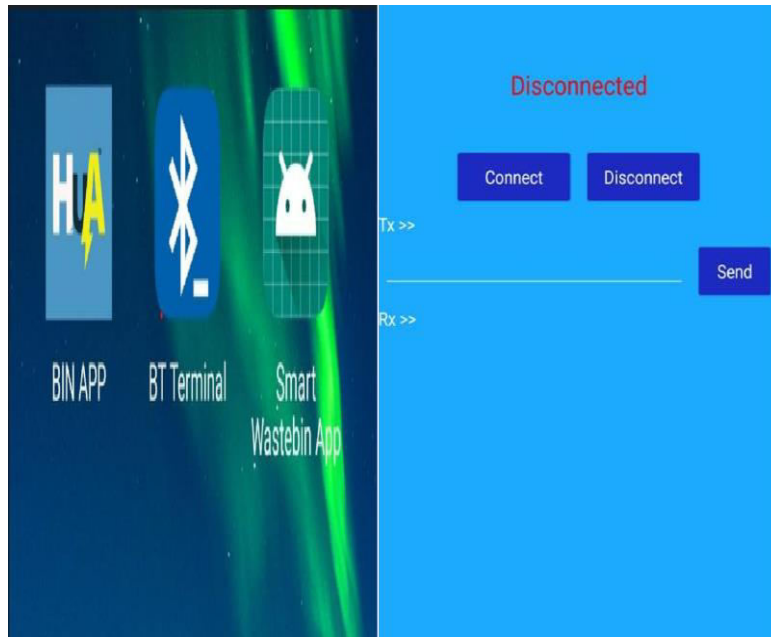


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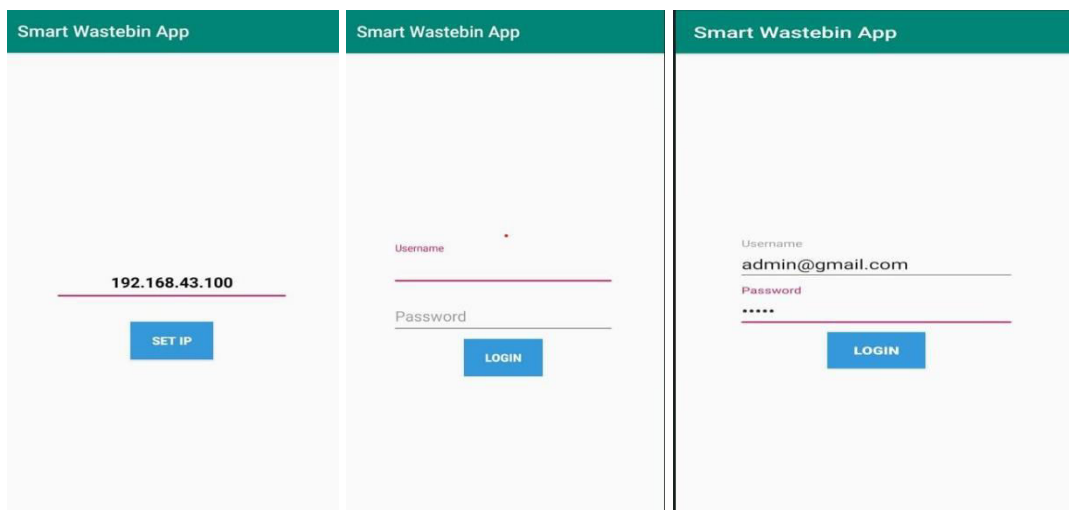
IV. EXPERIMENTAL RESULTS

Figures shows the results of android app of smart waste bin Figs. 2, 3, 4 (a) shows the three apps. (b) is the app for Bluetooth connection. (c) is the front page smart waste bin.(d) is the sign up page for smart waste bin.(e) is the admin sign in page of smart waste bin.



(a)

(b)



(c)

(d)

(e)

V. CONCLUSION

The project is based on waste collection in shopping malls, theaters and university libraries...etc. Usually people never give an interest in depositing plastic and organic waste in different bins. They are too much careless in such situation. But by providing incentives or any kind of reward, makes them to take a change in this approach. Implementation of this system is very useful in waste recycling and processing of different type wastes. The option of charging any electronic device for the bin user can be omitted to reduce the cost and receive a better performance from the power bank. Finally, this project managed to present a cost effective and user friendly smart waste bin for small scale cases.

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