

Plastic Eco-Redeemer Vending Machine

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Abstract - the primary focus of Plastic Eco-Redeemer vending machine is the collection process of plastic water bottles and using mobile applications for giving away rewards.

It is a technique that may be used to boost the rate of recycling. It can also be a responsible technique to lessen the plastic waste such as water bottle that are discarded without knowledge the plastic waste can be recycled. This device can be set up in numerous areas including railway station, bus stops, airports, and other public spaces. Plastic bottles are significant source of waste. Recycling may reduce the amount of plastic water bottles thrown to trash or landfills. In addition of helping to decrease the plastic waste. It also helps to decrease energy usage and greenhouse gases emission. It also assists to generate employment. We can save several resources such as oil & gas by recycling plastic waste. The machine works by operating using QR code scanner and inserting water bottle into the vending machine. This process is very user friendly and simple in front end and back end. Initial calculations are performed in the mobile application and the weight and exchange price will be displayed.

Key Words: Eco Redeemer, vending machine, Mobile application, Plastic bottles, Recycling, QR code, Employment, Frontend, Back end, Weight, Process, Exchange price,

1. INTRODUCTION

The world is in peril and suffers greatly from the everyday manufacturing of so much plastic and the usage of so many plastic items. Recycling is the conversion of trash into useful materials. It is fully implemented with official support in Western countries. But rubbish is a regular sight in our country. The promotion of recycling by local governments receives less attention. As part of one of the neighborhood projects, recycling bins are put in public spaces. It follows that people are deterred from recycling because of its inconvenience and inefficiency. Another tactic used to encourage recycling is offering cash or gift cards to those who bring recyclables to shopping centers. However, since maintaining the initiative requires a full team, it cannot be effectively executed in our country. By awarding depositors with reward points for each item that is recycled, Plastic Eco-Redeemer Vending Machine hopes to encourage the practice

of recycling. After discovering its advantages, this technology has been installed in other countries. India is making efforts to reduce trash, but the Plastic Eco-Redeemer Vending Machine's high implementation and maintenance costs make it impractical to use [1]. This project is largely motivated by the need to promote the adoption of Plastic Eco-Redeemer Vending Machines in India by developing a prototype that focuses on reducing energy consumption. Only a tiny portion of the bottles that are used are recycled, which results in an excessive number of bottles being utilized. We thus created a smart machine for disposing of plastic bottles to tackle this significant issue by making recycling practical and beneficial for the general population. Such a device functions similarly to an ATM in terms of simplicity. This device has a bottle port that can take bottles. The bottle may be inserted at the discretion of the user. A weight mechanism is used to determine whether to accept the bottle for recycling once it has been added to the intake. The depositor may earn rewards points by entering their special PIN if the bottle is approved. The bottle is returned to the user if it is rejected. A variety of venues, including retail centers, bus stops, and train stations, may benefit from this effort.

2. LITERATURE SURVEY

[1] The design and installation of a Plastic Eco-Redeemer Vending Machine (RVM) for recycling plastic bottles are discussed in this study. The benefits of RVMs and the necessity for their deployment are briefly discussed by the writers. The document outlines the bottle recycling process flow as well as the hardware and software components utilized in the RVM. The authors conclude that using RVMs may help decrease plastic waste and promote more environmentally friendly behaviors.

[2] This essay provides an overview of the many RVM varieties and their operational tenets. The authors talk about the need for plastic waste management and how RVMs could help. The report also offers a thorough evaluation of RVMs' environmental effect and cost-benefit ratio. The authors conclude that RVMs may be an efficient tool for managing plastic waste and that they need to be used more widely.

[3] The concept and development of an Arduino-based RVM for recycling plastic bottles are discussed in this article. The

process flow for recycling bottles as well as the hardware and software parts utilized in the RVM are both thoroughly described by the authors. The advantages of employing Arduino in RVMs and the possibility for advancements in the future are also covered in the article. The authors conclude that the use of Arduino may increase the efficacy and efficiency of RVMs for managing plastic trash.

[4]An overview of the present condition of plastic manufacturing and recycling is given in this chapter. The necessity for sustainable practices is discussed along with the difficulties and restrictions associated with managing plastic garbage. The chapter also covers the advantages and disadvantages of using RVMs as a technique for managing plastic waste. The authors conclude that managing plastic waste requires a complete strategy, and RVMs may be a key component of this strategy.

[5]The recycling of beverage containers is thoroughly examined in this PhD dissertation, as is the potential Japanese market for RVMs. The advantages of RVMs, the difficulties in implementing them, and the possibilities for their adoption are all covered by the author. The article also includes the findings of a study done to determine customer interest in RVM usage. The author draws the conclusion that RVMs may enhance the efficacy and efficiency of the recycling process and can support more sustainable practices.

[6]The Plastic Eco-Redeemer Vending Machine (RVM) is a creative way to promote recycling, according to the article "Reduce, Reuse, Recycle with the Plastic Eco-Redeemer Vending Machine" from the USC Viterbi School of Engineering. Used beverage containers and other recyclable materials are accepted by the RVM, a kind of vending machine, in return for rewards like cash, vouchers, or loyalty points. The article outlines the advantages of the RVM, such as lowering carbon emissions, raising recycling rates, and minimizing landfill trash. It also offers details on the sensors, sorting systems, and data analytics used by the RVM's technology. For individuals interested in environmentally friendly trash management and recycling programmers, the USC Viterbi School of Engineering page is a great source of information.

3. PROBLEM STATEMENT

- Plastic pollution is increasing.
- Recycling of plastic is declining.
- The number of plastic items is rising daily.

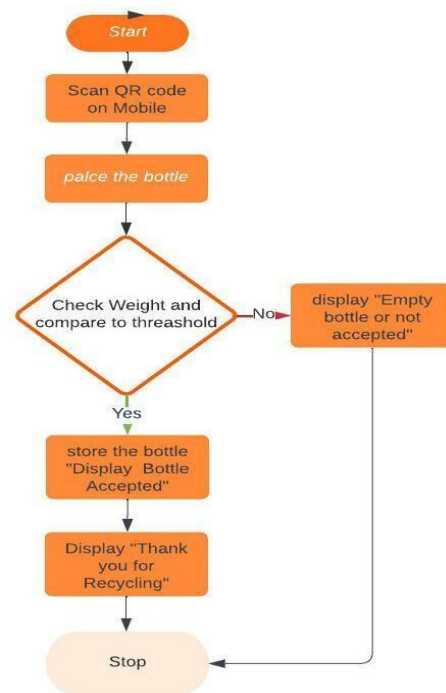
The public's ignorance about plastic recycling

4. OBJECTIVES

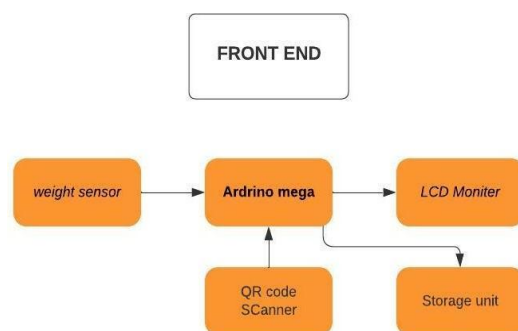
- Reduce the amount of plastic entering the environment.
- Increase the amount of plastic recycled.
- Make it easier for people to recycle plastic.

5. PROPOSED METHODOLOGY AND CIRCUITRY

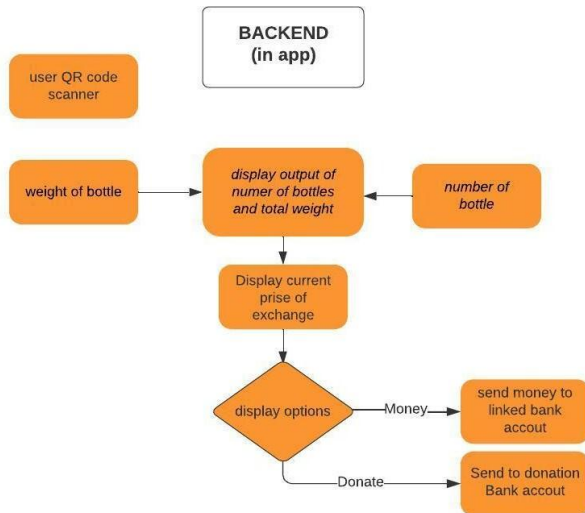
The project's work is shown in the following flowchart.



The bottle may be put into the chamber once the user scans the displayed QR code. If the bottle weighs less than the predetermined amount, it is taken inside the chamber and the message "BOTTLE ACCEPTED" is shown. The word "THANK YOU" is displayed to show how much are appreciated for their contribution to the recycling process. The bottles are rejected and labelled "EMPTY BOTTLE" if the weight of the bottle measured is more than the pre-set value.



The front end of the process uses an Arduino Mega that is programmed to show the weight of the bottles gathered. The sensors attached to the Arduino Mega are used to measure weight, and the LCD is used to show the information.

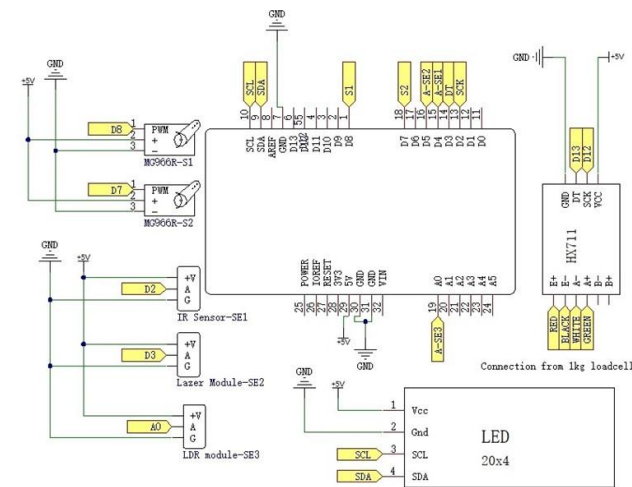


When the user scans the QR code once it has been presented, the machine dispenses the bottle and measures its weight and sends rewards accordingly to the mobile application which can further be redeemed for physical money.

- Plastic Eco-Redeemer Vending Machines assist in minimizing waste by collecting plastic bottles for recycling, which lessens the quantity of plastic trash that pollutes the environment or ends up in landfills.
- Efficient: The sorting and compression of plastic bottles for recycling may be automated by the machines, which are fitted with sensors and increase efficiency.

Plastic Eco-Redeemer Vending Machines have the following drawbacks:

- High cost: These devices may be expensive to install and maintain initially, which may prevent some people from using them.
- Plastic Eco-Redeemer Vending Machines only take plastic bottles, thus other recyclables could not be collected. Limited materials accepted.
- Limited capacity: To keep them from filling up and overflowing, these machines need to be regularly maintained.
- These devices depend on technology, including sensors and QR codes, which may break down and sabotage the recycling process.



6. BENEFITS AND DRAWBACKS

Benefits of Plastic Eco-Redeemer Vending Machines made of plastic bottles.

- Plastic Eco-Redeemer Vending Machines motivate people to recycle by giving them incentives in return for their used plastic bottles.
- Convenient: By installing these units in public areas like shopping centers, airports, and railway stations, the public will have easier access to recycling.

7. HARDWARE IMPLEMENTATION



8. RESULT

A thorough and effective method for handling plastic bottle recycling is provided by the hardware implementation discussed above. Users first place the plastic bottles through the top opening to begin the procedure. An infrared (IR) sensor of industrial quality determines if the bottle has been

inserted correctly, guaranteeing precise functioning. The circuitry further examines the input material, differentiating between metallic and non-metallic materials, improving recycling precision. A sensor and load cell are used to detect the bottle's weight, giving accurate readings that are presented on a screen. Furthermore, the vending machine has a QR code that needs to be scanned, links customers to a special website where they may claim rewards for their recycling efforts. This comprehensive strategy encourages openness, practicality, and motivates people to actively engage in recycling programs.

9. APPLICATIONS

This System Can Be Implemented in Public and Transportation Hubs Such as:

- Railway stations
- Bus stands
- Airports, Etc.

10. CONCLUSION

To Sum Up Given that the Project aims to solve two important concerns at once, first off, it directly addresses one of the main causes of plastic pollution by seeking to reduce plastic bottle waste. When plastic bottles are not properly disposed of or recycled, they often end up in landfills or in our seas, endangering the environment and marine life severely. Second, the Project implementation can encourage growth of a neighborhood that values recycling. By promoting and encouraging the recycling of plastic bottles, it raises people's awareness of their responsibilities and the importance of sustainable practices. In the end, this Project can be crucial for reducing plastic pollution and creating a society that values the environment.

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