

DEVELOPMENT OF WASTE PLASTIC BOTTLE COLLECTING MACHINE THAT REWARDS THE RECYCLER WITH MONETARY BENEFITS

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Abstract:

The major contribution to the plastic waste generated which is thrown away after their usage. It is aimed to build a reverse vending machine for collecting plastic bottles with reward mechanism. The technology used for identifying plastic bottles is a proximity sensor. The bottles are sent inside the entrance and number of bottles are counted, then they are sent to the crusher. Once the number of bottles are detected and crushed, depositors can claim the points by entering a unique id and the accumulated points can be used to generate promo code or give equivalent reward to the user. The user and authority can keep track of their bottle and reward details by maintaining an account in the application software developed. Once the storage unit of the machine is filled, this could be notified to the authority via messaging through the application.

Keywords: Plastic, waste, proximity sensor, reward system.

1. INTRODUCTION

Consumption frenzy, which is one of the biggest problems of today's world and has become very dangerous, continues to increase rapidly day by day. Daily life products, which make up a large part of this consumption, are quite harmful for our environment. One of these daily life products is the plastic bottles we use to store the water necessary for the continuity of our lives. Of course, it's not limited to just that. Pet bottles and cans; may include any other soft drink. If plastic bottles and cans are not recycled, they continue to exist for thousands of years without decomposing in nature and poison the environment. The recycling of these products and the development of systems that enable them to recycle are essential for our environment and our world. These products, which are harmful to the environment, must be collected before they can be recycled. For this, it is important to integrate systems into daily life and make them accessible to everyone. Examples of these systems are recycling vending machines. These vending machines, which are accessible to every person and can be used to make the surplus plastic bottles and cans ready for recycling, not only to store the products, but also to crush them and make them more suitable for recycling. Hence, it is understood that the importance of recycling vending machines is great. In this thesis, a new recycling vending machine design is described. In order to create the design, first of all, market research was carried out.

2. METHODOLOGY

The completed design of machine accepts plastic bottles as input and reward the user with credit points or normal reward that can be used later. There are many types of bottles that are available nowadays and classifying them as plastic and non-plastic is a complex problem. In the proposed system Image processing is used for this classification and IR sensor is used for the counting of the bottles. The proposed system is comprised of 3 stages that include Image processing, Reverse Vending Machine and Application software. The Reverse Vending Machine is where user enters the plastic bottles for recycling. In this the user puts in bottle and gets credit points. The main functions of the machine include bottle acceptance, fill the storage system and alerting the developers when the machine is filled. The system uses a monitoring technique to monitor the machine. This can help the developers to get real time information about the machine. The machine fill detection is based on an IR sensor placed on the machine which could be used to detect the filled level of the machine. It will then instruct the

authorities that the storage is full so that it can be taken by the authorities. For interfacing the sensor with the server we use an app module that enables serial port communication.

2.1 IR Sensor

IR Sensor is of great importance in recycling vending machines. If the IR Sensor system is designed well, this both speeds up the process and prevents unwanted materials from entering the system. Today, recycling vending machines use different barcode technologies, but some vending machines do not have this technology. 360 degrees barcode reader can be given as the most advanced example of these technologies. Since the bottle can be read quickly without the need to turn it when it is thrown in, the transmission process continues without hesitation, which increases the efficiency of the system. Another technology is normal barcode reader systems

2.2 Shredding and Sorting

After the proximity reading stage, the bottles go to the shredders due to the transmission parts; shredded and sorted. In some models, this process can be reversed, the bottles are first separated, then ground and stored. The importance of the shredder is crucial for storage and subsequent recycling processes. Because the finer the waste is ground, the more efficient its recycling and storage will be.

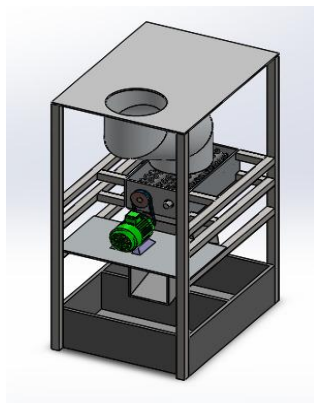


Fig 1

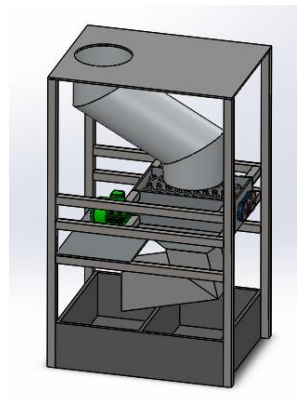


Fig 2

3. CONCLUSIONS

As a result of this 2-month project, a design of a recycling vending machine was created that is compact, efficient, cost-effective, and meets new market needs. New updates have been added to every previous version of this design, which has been continuously developed since the beginning of the project, and this modeling was constantly updated throughout the project period like the liquid separation process and the digital reward system. This machine, can give more space for storage due to its compact part design and crushing bottles, Although this recycling vending machine has a single shredder and a single motor, it can crush, sort, and store both plastic bottles, tin and cans, thanks to its efficient design.

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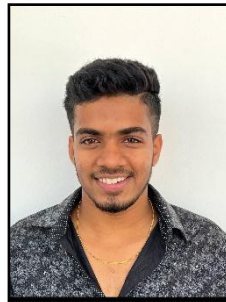
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