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PLASTIC BOTTLE AND METAL CAN COLLECTION AND REWARDING MACHINE

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Abstract: Due to their utility and production flexibility, plastics are used in a variety of throwaway goods, high-end technology components, etc. A severe environmental problem caused by the global proportion of plastic waste has led to a demand for plastic waste management methods. Successful plastic recycling requires enhancing resource recovery through adequate sorting and collection technologies.

In order to achieve an ideal design and more efficiency, this study presented a three-step optimization process for a reverse vending machine (RVM), a compact automatic recyclable garbage sorter/collector system. Reducing pollution from plastics will require action and international cooperation to reduce plastic production, including through innovation, better product design, and the development of environmentally friendly alternatives, as well as efforts to improve waste management and increase recycling. To overcome such an issue, in this project, an automatic collecting bin with a reward feature is proposed as a plastic bottle and metal can collection and reward machine.

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Keywords: plastic, metals, cans, bottles.

I. INTRODUCTION

Plastic waste generated annually per person varies from 221 kg in the United States and 114 kg in European OECD countries to 69 kg, on average, in Japan and Korea. The report finds that the COVID-19 crisis led to a 2.2% decrease in plastics used in 2020 as economic activity slowed, but a rise in litter and food takeout packaging. Reducing pollution from plastics will require action, and international cooperation, to reduce production, including through innovation, better product design, and the development of environmentally friendly alternatives, as well as efforts to improve waste management and increase recycling. Plastic consumption increased as economic activity resumed in 2021. Most plastic pollution comes from inadequate collection and disposal of larger plastic debris known as microplastics, but the leakage of microplastics—synthetic polymers smaller than 5 mm in diameter—from things like plastic pellets, synthetic textiles, and road markings is also a serious concern. The world is producing twice as much plastic waste as two decades ago, with the bulk of it ending up in landfills, being incinerated, or leaking into the environment. Only 9% of it is successfully recycled, and 22% of it has been improperly recycled. Due to the increasing amount of waste generated and the limited landfill space for waste disposal, recycling is one method of effectively managing waste. The current process of recycling requires the user to bring the waste in bulk to the recycling center. That might be a hassle, which would discourage them from recycling. To avoid such difficulties, in this project, an automatic collecting bin with a reward feature is proposed as a plastic bottle and metal can collection and reward machine. Modern plastics are created from chemicals sourced from fossil fuels, such as natural gas or petroleum, but newer industrial processes have utilized variations made from renewable materials, between 1950 and 2017, 9.2 billion metric tonnes of plastic are thought to have been produced.400 million tonnes of plastic will be created in 2020. By 2050, yearly worldwide plastic production is anticipated to surpass 1,100 million metric tonnes, assuming present trends in plastic use around the world hold true.

In an effort to allay environmental worries at the end of the 20th century while continuing to make virgin plastic and shifting the blame for plastic pollution onto consumers, the plastics sector pushed recycling. At the time, the major plastics-producing businesses questioned the economic sustainability of recycling, and the situation hasn't changed. Because post-consumer plastics must currently be cleaned and sorted for efficient reuse, plastic collecting and recycling are mainly useless. The majority of plastic created has not been recycled; instead, it has either been dumped in landfills or is still contaminating the environment. Plastic pollution, for instance, may be found in all of the world's major water bodies, polluting and causing waste patches in all of the oceans.

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II. LITERATURE REVIEW

[1]In this work, they designed a machine that accepts only plastic bottles as input and returns credit points that can be used for online shopping. They have used a mechanism of three stages: the first is image processing, the second is reverse vending, and the third is the application software. It only collects plastic bottles of a certain type and does not have a bin volume level indication. It does not provide any security, like GPS location. It does not collect metal cans. It does not collect other objects other than plastic and metal cans and bottles.

[2]In this work, they designed the system model and process, and in their theoretical design, they have made the model into three stages in which three sensors are used in each stage. Plastic objects serve as input materials, which are detected by the various sensors. First, it checks whether it is plastic or not with the help of a capacitive sensor, and then received plastic objects are sent to a weight sensor with which they measure the weight of the plastic and are rewarded according to the weight of the plastic in the form of coins. It does not have a bin volume level indication. It does not provide any security, like GPS location. It does not collect metal cans. It does not collect other objects other than plastic and metal cans and bottles.

[3] In this work, they designed a machine that accepts only metal objects and they used sensors based on that input has been accepted they have designed specifically for collecting metal-related objects and the rewarding machine does not have a bin volume level indication. It does not provide any security, like GPS location. It does not collect plastic-related objects. It does not collect other objects other than metal objects and bottles.

[4] In this work, they designed a machine that accepts only plastic bottles, when the user tries to insert the bottle the camera captures whether it is a plastic bottle or not after verifying the images it starts taking them into the machine using a conveyor belt if it is not a plastic bottle it throws the item from the machine and they using a reward for every 4 bottles. It does not provide any security, like GPS location. It does not collect plastic-related objects. It does not collect other objects other than metal objects and bottles.

[5] In this work, they designed a machine that accepts only plastic bottles, when the user tries to insert the bottle it shreds it pieces it can take 4 bottles at a time whether it is a plastic bottle or not after verifying the images it starts taking them into the machine using a conveyor belt if it is not a plastic bottle it throws the item from the machine and they using a reward for every 4 bottles. . It does not provide any security, like GPS location. It does not collect metal-related objects. It does not collect other objects other than metal objects and bottles.

[6] In this work, they designed a machine that can take plastic bottles or metal cans with the help of a sensor inside the machine, and they used a crushing prototype inside the machine. With the help of the crushing machine, the volume of the bottle or tin can be reduced and sent to the appropriate bins, and tokens are displayed on the LCD display. It does not provide any security, like GPS location. It does not collect other objects other than metal objects and plastic bottles.

[7] In this work, they designed a machine that accepts only metal objects and plastic objects aslo they used sensors based on that input has been accepted they have designed specifically for collecting metal-related objects and the rewarding machine does not have a bin volume level indication. It does not provide any security, like GPS location. It does not collect plastic-related objects. It does not collect other objects other than metal objects and bottles.

[8] In this work, they designed a machine using CNN and an image-processing dataset. When a user uses the machine and places an object, whether plastic or metal, it is verified using CNN software before being fed onto a conveyor belt and image processing, whether it is a plastic bottle or a metal can. It does not provide any security, like GPS location. It does not collect other objects other than metal and plastic objects and bottles.

[9] In this work, they designed a machine that accepts only plastic bottles as input and returns according to the weight of the materials they are rewarding as coin based system. They have used a mechanism of three stages: the first is image processing, the second is reverse vending, and the third is the application software. It only collects plastic bottles of a certain type and does not have a bin volume level indication. It does not provide any security, like GPS location. It does not collect metal cans. It does not collect other objects other than plastic and metal cans and bottles.

[10] In this work, they designed the system model and process, and in their theoretical design, they have made the model into three stages in which three sensors are used in each stage. Plastic objects serve as input materials, which are detected by the various sensors. First, it checks whether it is plastic or not with the help of a capacitive sensor for metals and an inductive sensor for plastic, and then received plastic objects are sent to a weight sensor with which they measure the weight of the plastic and are rewarded according to the weight of the plastic in the form of coins. It does not have a bin volume level indication. It does not provide any security, like GPS location. It does not collect metal cans. It does not collect other objects other than plastic and metal cans and bottles.

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III. CONCLUSION

Reducing pollution from plastics will require action and international cooperation to reduce plastic production, including through innovation, better product design, and the development of environmentally friendly alternatives, as well as efforts to improve waste management and increase recycling. The current process of recycling requires the user to bring the waste in bulk to the recycling center. That might be a hassle, which would discourage them from recycling. To avoid such difficulties, in this project, an automatic collecting bin with a reward feature is proposed as a plastic bottle and metal can collection and reward machine

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