CASHBACK DUSTBIN

A report submitted in partial fulfillment of the Academic requirements for the award of the degree of Bachelor of Technology

Submitted by

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UNDER THE COURSE

SOCIAL INNOVATION & PRACTICE

CENTRE FOR ENGINEERING EDUCATION RESEARCH

CMR COLLEGE OF ENGINEERING & TECHNOLOGY
(Autonomous)
(NAAC Accredited with 'A+' Grade & NBA Accredited)
(Approved by AICTE, Permanently Affiliated to JNTU Hyderabad)
KANDLAKOYA, MEDCHAL ROAD, HYDERABAD-501401

2022-23

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CERTIFICATE

This is to certify that the report entitled **" CASHBACK DUSTBIN "** is a bonafide work done by **RAVIPATI SWETHARATNAM-(21H51A66D3), SHEELAM SAKESH-(21H51A66D5),KRISHNA VAMSHI- (21H51A6673 ,PHANINDRA-(21H51A6604),DOLIKA (21H51A6603),SOMMELA SRICHARAN (21H51A66D6)** of II B. Tech, in partial fulfillment of the requirements for the award of the degree of Bachelor of Technology, submitted to Centre for Engineering Education Research, CMR College of Engineering & Technology, Hyderabad during the Academic Year 2022-2023.

(Names of the Project Coordinators)

Dr.B.SURESH RAM
Head (CEER)

1. **Mr.K.Sathish, Assistant Professor.**
2. **Mr. B.Venkateshwar Rao, Assistant Professor.**
3. **Mr.S.Suresh, Assistant Professor.**

DECLARATION

We, the students of II B. Tech of Centre for Engineering Education Research , **CMR COLLEGE OF ENGINEERING &TECHNOLOGY**, Kandlakoya, Hyderabad, hereby declare, that under the supervision of our course coordinators, we have independently carried out the project titled **"CASHBACK DUSTBIN"** and submitted the report in partial fulfillment of the requirement for the award of Bachelor of Technology in by the Jawaharlal Nehru Technological University, Hyderabad (JNTUH) during the academic year 2022-2023.

Name of students	Roll Number	Signature of the
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Finally, we thank all our faculty Mr. K. Sathish, Mr. B. Venkateshwar Rao, Mr. S. Suresh and LabAssistants for their valid support.

We owe all our success to our beloved parents, whose vision, love and inspiration has made us reach out for these glories.

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ABSTRACT

The project's aim is to reduce non-bio-degradable waste. The selected theme is WASTE MANAGEMENT, and the main aim of waste management is to reduce the dangerous effect of such waste on the environment and human health. A big part of waste management deals with municipal solid waste which is created by industrial commercial and household activity.

The need of our project is raised from day-to-day requirements in our society. Now a days all of us are throwing the used water bottles on the roads instead of throwing in the dustbins by this we are facing environmental issues in order to reduce this we were going to introduce the cashback dustbin.

So that it would be scanned when we throw into the dustbin and person would get a cashback.

CHAPTER 1

INTRODUCTION

Waste management involves the processes of waste collection, transportation, processing, as well as waste recycling or disposal. Sustainable waste management systems include advanced management strategies to minimize environmental challenges and protect resources. With waste being properly disposed of, our environment is cleaner, meaning there are fewer health risks and hazards around to affect us. This includes not having our surroundings polluted and, instead, ensures that our society remains as healthy as possible. The main objective of Waste management is to reduce the environmental and health hazards that arise from indiscriminate dumping of waste and pollution of natural resources like the land, sea, and air. Waste management is the managing of waste by disposal and recycling of it. Moreover, waste management needs proper techniques keeping in mind the environmental situations.

One of our ideas is cashback dustbin where reduction of plastic takes place. Waste management is important as it saves the environment from the toxic effects of inorganic and biodegradable element present in waste. One of the essential aspects of waste management is recycling, and when you do it, you're helping in the conservation of natural resources by reusing materials such as glass, plastic, oil, and paper.

7R principal

- Recycle.
- Refuse.
- Reduce.
- Reuse.
- Repair.
- Re-gift.
- Recover.

CHAPTER 2

LITERATURE REVIEW

Many of the people used various techniques to avoid throwing of plastic bottles on the road by reuse, recycle…etc.

New Delhi MP Meenakshi Lekhi inaugurated the machines, installed at A, E, and F blocks. "It is a first-of-its kind machine. It is aimed at promoting behavioural attitude and motivate people to throw plastic bottles and cans here only. It will help segregate waste and encourage people to not litter the roads. Once a plastic bottle or a can is dumped into the machine, the cash will get directly transferred to the user's e-wallet. The machines have been installed as part of innovative technologies to be used to manage waste in Lutyen's Delhi under the Smart City initiative. "When people visit a tourist spot or a marketplace, they are likely to have a bottle of water or soft drink or wrappers, which they will need to dispose. The machine will recycle the waste, which is a scientific solution to manage waste," NDMC Chairman Naresh Kumar said. The civic body had earlier installed two such machines, which would have churned out freebies such as coupons, but they were not a success. The Council now plans to set up 20 such reverse vending machines across the area within this year, officials said.

2.1: Using bio based biodegradable polymers:

Polylactide (PLA) is a biodegradable polymer produced from lactic acid derived from sugar beets, sugar cane and corn. It's commonly used in packaging industries, textiles, electronics, 3D printing and biomedical applications, thanks to its durability and low toxicity. A company based in the Netherlands has successfully made PLA bioplastic resins from second generation feedstocks to relieve pressure from food crops. However, their production costs are high, ranging from $2.6 to $5.5 per kilogram, and thus requires government support during its infancy.

2.2: Converting of plastic into roads:

One of the many scientific solutions to plastic pollution is to convert plastic into roads. A project known as plastic road created a bike path in the Dutch city of Zwolle and a road in Overrise in 2018 using 70% recycled plastic. The plan is to increase this to 100%. The project has been proven successful as plastic is more durable than asphalt and requires less heavy equipment and

time to install, which makes its carbon footprint smaller. PlasticRoad intends to carry on designing, creating and supplying these sustainable, climate-proof and circular roads, made from municipal plastic waste and "with the smallest possible negative impact on our planet and natural resources.

Be it used plastic bag, broken glass, obsolete cell phone, or used battery cells, they are all used products that require appropriate disposal to limit their harm to the environment. Waste disposal is therefore a systematic action for managing waste from its origin to its final disposal. It includes incineration/burning, burial at landfill sites or discharge at sea/lake/river, and recycling. Word Web defines waste disposal as a "unit for getting rid of and destroying or storing used, damaged or other unwanted industrial, agricultural or domestic products and substances." It also entails proper discard or discharge of the material waste in accordance with the local environmental regulatory framework. Because waste disposal involves a myriad of processes such as collection, transportation, dumping, recycling, or sewage treatment among other waste product monitoring and regulation measures, there are lots of problems associated with waste disposal. Here are the common waste disposal problems and their solutions.

Australian company Licella Holdings has developed a new patented technology, known as the Catalyic Hydeothermal Reactor (Cat-HTR), that can convert unrecyclable plastic into oil, it has been able to melt plastic and convert it into liquid fuel. Through a process similar to a commercial-sized pressure-cooker, it reduces plastic to its component parts, producing a range of materials including oils, waxes and plastics that can be turned into other plastic products or fuels.What makes this technology so unique is its versatile nature. No plastic is a match for this device. The Cat-HTR chemically recycles mixed plastics without the need to separate the different plastic types. This includes end-of-life plastic that would otherwise be sent to landfills, incineration or end up in our oceans. It allows plastic waste to be recycled over and over again and on a commercial scale, and could convert 20,000 tonnes of plastic waste annually. However, critics have labelled the technology as an environmental trade-off as the process may produce further carbon emissions.

CHAPTER 3

PROBLEM DEFINITION

3.1: PROBLEM STATEMENT

Now a days all of us are throwing the plastic bottles on the roads. In order to get rid of it, our idea is cashback bin. Firstly, after usage of water bottle, we should scan that bottle to the dustbin containing scanner. When we throw the bottle into dustbin the laser will detect the bottle the coin comes out of the box.

3.2: OBJECTIVES

- To emphasize the reduced use of plastic and the beneficial management of plastic waste.
- Making our environment an eco-friendly zone.
- Our project motive is mainly to throw the plastic water bottle into the dustbin.
- To motivate people in plastic management

3.3: REQUIREMENT ANALYSIS

ARDUINO UNO

The Arduino UNO is a standard board of Arduino. Here UNO means 'one' in Italian. It was named as UNO to label the first release of Arduino Software. It was also the first USB board released by Arduino. It is considered as the powerful board used in various projects. Arduino.cc developed the Arduino UNO board.

Arduino UNO is based on an ATmega328P microcontroller. It is easy to use compared to other boards, such as the Arduino Mega board, etc. The board consists of digital and analog Input/Output pins (I/O), shields, and other circuits.

Fig 3.3.1 LASER

LASER

Laser, a device that stimulates atoms or molecules to emit light at particular wavelengths and amplifies that light, typically producing a very narrow beam of radiation. The emission generally covers an extremely limited range of visible, infrared, ultraviolet wavelengths. Many different types of lasers have been developed, with highly varied characteristics. *Laser* is an acronym for "light amplification by the stimulated emission of radiation."

SERVO MOTOR

A **servo motor** is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor. It is just made up of a simple motor which runs through a **servo mechanism**. If motor is powered by a DC power supply then it is called DC servo motor, and if it is AC-powered motor then it is called AC servo motor. For this tutorial, we will be discussing only about the **DC servo motor working**. Apart from these major classifications, there are many other types of servo motors based on the type of gear arrangement and operating characteristics. A servo motor usually comes with a gear arrangement that allows us to get a very high torque servo motor in small and lightweight package.

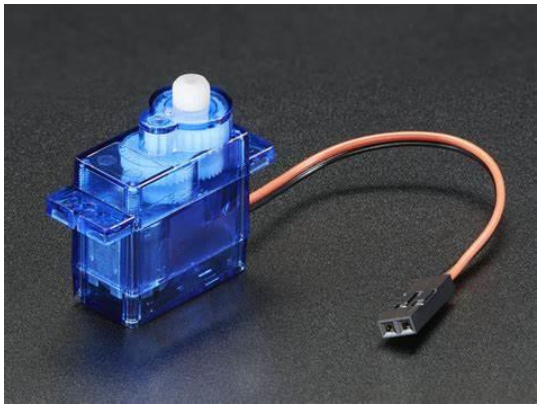


Fig 3.3.3 Servo Motor

LDR

An **LDR sensor (Light Dependent Resistor)** is a device that is used to detect light.It has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light sensing circuits.They are used in many consumer products to determine the intensity of light.An LDR or light dependent resistor is also known as a photoresistor, photocell, photoconductor.It is one type of resistor whose resistance varies depending on the amount of light falling on its surface. When the light falls on the resistor, the resistance changes. To sense the presence of light these resistors are often used.

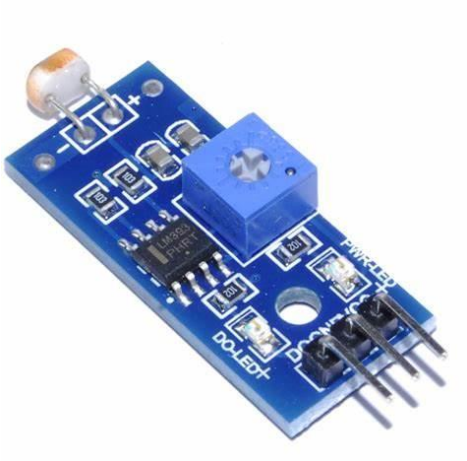


Fig 3.3.4 LDR

JUMPER WIRES

Fig 3.3.5 JUMPER WIRES

Jumper wires typically come in three versions: male-to-male, male-to-female and female-to-female. The difference between each is in the end point of the wire. Male ends have a pin protruding and can plug into things, while female ends do not and are used to plug things into. Male-to-male jumper wires are the most common and what you likely will use most often. When connecting two ports on a breadboard, a male-to-male wire is what you'll need.

DUSTBIN

Fig 3.3.6 DUSTBIN

A dustbin is mostly used at home for storing waste materials in your house. Apart from this, it also helps you keep the area neat and clean.

3.4: METHODOLOGY

The machine is designed to reduce plastic pollution .When a person puts a used plastic bottle in our cashback bin then the laser present in the vending machine detects that bottle is thrown into the bin then arduino gets signal that a plastic bottle is thrown.Then after Arduino sends signals to servo motor such that when servo motor rotates a coin gets dispensed to the customer.This mechanism is much similar to a vending machine.The only difference is that in a vending machine customer put coin to get the product but here we put a plastic bottle as a input and we get coin as a product.By this machine we can encourage people to throw bottle only in our bin because if they put it in our bin then they get a cashback coin.

Here to get coin when a bottle is thrown we use a servo motor placed at the end of a pvc pipe piece.Such that when the servo motor is rotated then a coin gets dispersed from the box.The thrown plastic bottles are collected in a bin connected to the reverse vending machine.

CHAPTER 4

4.1: DEFINITION

Our concept is when people dispose plastic waste bottles, aluminum and steel cans in Reverse Vending Machine then we collect this waste and give it for recycling otherwise people throw this openly and this is not good for our health and it also generates many diseases.

The reverse vending machine attempts to solve the efficiency problem of sorting waste to enhance the recycling process. Reverse vending machines work by permitting the user to insert the recycled containers within a specific aperture inside the machine. Consequently, the machine compresses the bottle to reduce its size and allow more of them to be stored within it before they are collected and returned to the bottling company. After the machine compresses the items, it sorts them for storage purposes, after which they will be delivered to companies responsible for recycling them.

4.2:NEED OF A REVERSE VENDING MACHINE

Waste is being accumulated at a growing pace all over the world, causing the need for new recycling solutions like reverse vending machines. In 2016 alone, over four hundred billion bottles were dispersed globally to consumers, with a little less than half of those bottles being amassed for recycling. With product-focused collection and recycling programs outperforming traditional recycling methods, in states like california or michigan, governments are increasingly looking to innovate in the sector by adopting government funding grant programs to help supply more machines throughout urban areas.

4.3: JUSTIFICATION

The reverse vending machine has several environmental and economic benefits. A person can be rewarded a monetary gain or other rewards by disposing of their waste, such as plastic bottles. This economic benefit is an incentive for people to dispose of their waste correctly. With landfills receiving 27 million tons of plastic in 2018, the RVM attempts to combat this by providing a convenient proper disposal method. The machine's design allows the user to only insert the item in, and no other action is required. This added convenience benefit enables the REVERSE VENDING MACHINE to correctly sort the waste, so it does not end up dumped in the environment. One of the focal points of having an RVM rather than a traditional recycling bin is the use of a crusher which allows for a larger capacity of storing waste.

4.4: PURPOSE

- Only 9% of plastic is recycled (this number is declining) due to China no longer accepting US plastics.
- More than $1 billion worth of plastic is wasted each year.
- The recommendation to drink 8 glasses of water a day equals about $.49 per year; that same amount of bottled water is about $1,400.
- America's demand for plastic water bottles uses over 17 million barrels of oil annually, enough to fuel 1.3 million cars for a year. This stat does not include the oil used for transportation.

4.5: SCOPE

4.1.1 Better technology can be used like we can use AI technology to simplify the task.

4.1.2 Security system could be modified.

CHAPTER 5

5.1: EXISTING SOLUTIONS

1) Using it in road construction

Inspired by a trip to India where he saw litter pickers collecting plastic and then melting it down to fill potholes, Toby McCartney returned to the UK inspired. Firstly, he tried to do the same on his own road but not greeted with the best reaction he set out to find a way to utilise plastics in road construction in a safe way instead.Toby founded the company MacRebur and after 844 failed trials they finally found a way to use single use plastic in road construction.

Fig. 5.1.1 Using it in road construction.

2) Eco-Bricks

If you haven't made an eco-brick yet, I encourage you to do so. The idea is that you stuff any single use plastics you use into a large 2 litre bottle until it is full. Once full and compacted as tightly as possible you have yourself an eco-brick.

Eco-bricking has turned into a global movement. Not only does it allow people to visually see how much single-use plastic they are using every day but it locks away the plastics and prevents them from entering the ecosystem.

Fig. 5.1.2 Eco-Bricks.

3) 3D Printing Street Furniture

3D printing is a growing technology. It allows anyone (well anyone who owns a 3D printer) to download the plans for an item and see it printed in 3D plastic right in front of their eyes.

A group of students at UC Berkley have managed to find a way to use old single use plastic materials, melt them back down and then use the to produce useful items, rather than just letting them reach landfill.

This was taken to another level by the ‘New Raw Association’ who used the same process on a large scale to 3D print street furniture out of waste plastics. It takes 100kg of plastic waste to create just one of the street benches, but when we are talking about finding a solution to this waste stream, the more plastic it takes the better.

Fig. 5.1.3 3D printing street furniture.

5.2: DRAWBACKS

Many designs are proposed till date and some of them are accepted finally and are converted into reality. But the main problem with all these designs is the cost factor.

Disadvantages of Eco-bricks: Despite their apparent advantages, some fear that making structures out of plastic might not be good for the earth in the long run. These non-recyclable plastics are manufactured from inorganic chemicals and, as the eco-bricks are exposed to the sunlight, they can leech into the natural environment.

Disadvantages of using plastic bottles in road construction.Toxics present in co-mingled plastic waste would d start leaching.The presence of chlorine will definitely release noxious HCL gas.

The cost of plastic roads is often a major concern for many cities and states looking to implement this new technology. The cost of plastic roads is typically less than asphalt or concrete roads, due to the fact that plastic roads are made up of recycled plastic.

5.3: PROPOSED DESIGN

The project aim is to reduce the non bio-degradable waste. The selected theme is WASTE MANAGEMENT and main aim of waste management is to reduce the dangerous effect of such waste on the environment and human health. A big part of waste management deals with municipal solid waste which is created by industrial commercial and household activity.

Our project model works as follows

- The used plastic water bottles and tin cans which are mostly used as cool drinks and energy drinks
  must be thrown into the dustbin.
- A Laser is inserted in the dustbin which helps to detect the object thrown into the dust bin .
- As soon as the laser detects the object ,with help of servo motor a cashback coin is thrown out of the bin.

CHAPTER 6

IMPLEMENTATION

6.1: WORKING

When a person puts a used plastic bottle in our cashback bin then the laser present in the vending machine detects that bottle is thrown into the bin then arduino gets signal that a plastic bottle is thrown.Then after Arduino sends signals to servo motor such that when servo motor rotates a coin gets dispensed to the customer.This mechanism is much similar to a vending machine.The only difference is that in a vending machine customer put coin to get the product but here we put a plastic bottle as a input and we get coin as a product.By this machine we can encourage people to throw bottle only in our bin because if they put it in our bin then they get a cashback coin.

6.2: ADVANTAGES

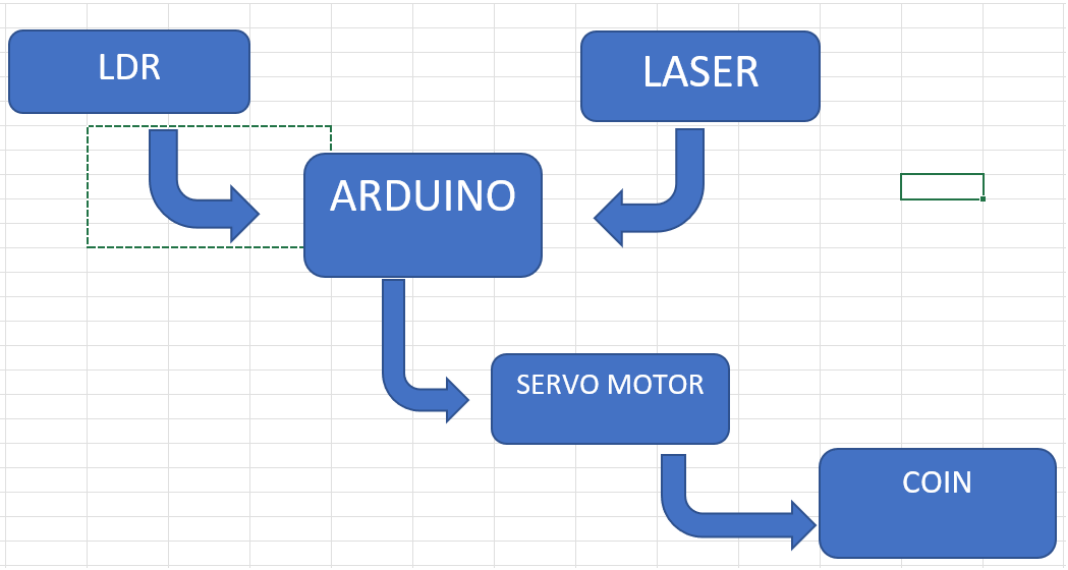
The cashback bin has several environmental and economic benefits. A person can be rewarded a monetary gain or other rewards by disposing of their waste, such as plastic bottles. This economic benefit is an incentive for people to dispose of their waste correctly.With landfills receiving 27 million tons of plastic in 2018, this bin attempts to combat this by providing a convenient proper disposal method.The machine's design allows the user to only insert the item in, and no other action is required.This added convenience benefit enables this bin to correctly sort the waste, so it does not end up dumped in the environment.One of the focal points of having a cashback bin rather than a traditional recycling bin is the use of a crusher which allows for a larger capacity of storing waste.

6.3: DISADVANTAGES

Aside from an economic perspective, CASHBACK BINS are subject to constant checkups, updates, and maintenance procedures which enable the artificial intelligence software to continue scanning and collecting data on the recyclable bottles. Despite the convenience that

reverse vending machines offer their users, the monetary rewards may be perceived as too insignificant to incentivize recycling from the general public.

6.4: BLOCK DIAGRAM OR SCHEMATIC DIAGRAM



6.4.1. BLOCK DIAGRAM

6.5: PROTOTYPE

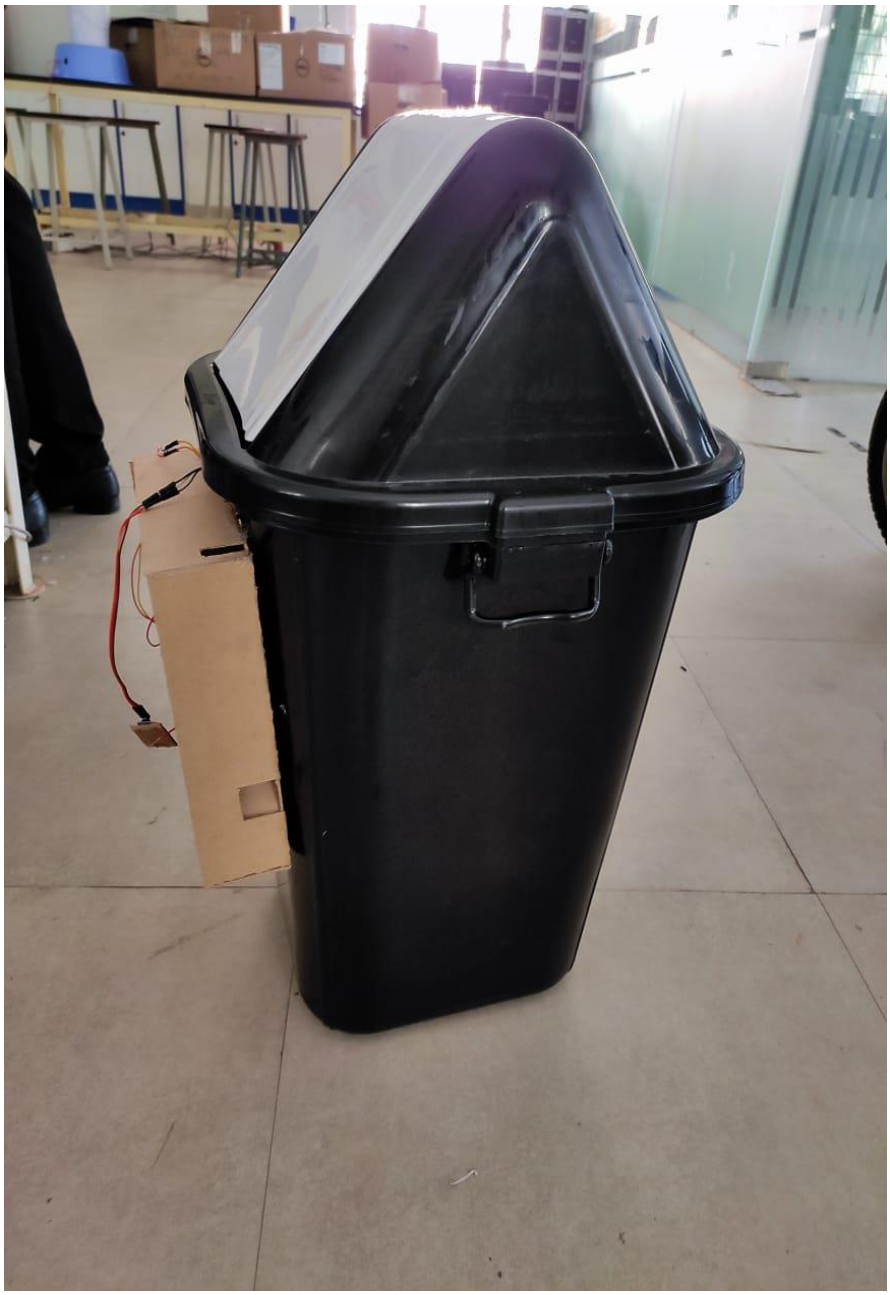


Fig.6.5.1 Cashback dustbin.

CHAPTER 7

RESULTS AND CONCLUSIONS

7.1 RESULT

When people know how they dispose of their waste through a cashback bin. It generates new thinking for made. That's we give slogan, "Throw Trash, get Cash". We give you a reward for your waste. We appeal came with us and make world clean.

7.2 CONCLUSION

Since plastic is considered as non-biodegradable waste, as it is used across almost every sector, including water bottles, tin can of cooldrinks, energy drinks etc., our project motive is to help to reduce the plastic wastage on roads which also helps in recycling.

CHAPTER 8

8.1 REFERENCES

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8.2 TEAM PHOTO WITH BUSINESS MODEL:

TEAM DETAILS

S.NO	NAME OF STUDENT	ROLLNUMBER	PHOTO
1.	**SWETHA RATNAM**	**21H51A66D3**	
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