

# TU20 CUP: IDEATION

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## **Idea 1: A.L.T.R (Adaptable Litter-Taking Robot)**

### **Overview**

If you have ever driven down the highway, taken a walk along the lakeshore or even walked through the city streets, you have seen littering firsthand. Discarded waste either on purpose or by accident, littering is an eyesore to the natural beauty, but it has many more serious consequences that impact the environment and animals alike.

Littering is becoming a major issue in our country and increasing daily. The issue of litter is a prevalent and urgent issue plaguing our world in modern times. Littering refers to throwing away garbage recklessly in the neighborhood instead of using trash bins or designated trash disposal areas. Litter is trash, such as banana peels, cigarette butts, broken bottles, plastic bags and wrappers thrown carelessly in an open or public place. This terrible habit is prevailing, it can have a severe impact on our environment. The negative effects of litter impact humans, organisms and the environment in a plethora of ways. Dealing with litter can help achieve many United Nations Sustainable Development Goals (3, 6, 9, 11, 12, 13, 14, 15, 16, 17) while providing benefits to different stakeholders (Government, businesses, citizens and tourists). The issue of litter impacts developing and developed countries and urban, suburban and rural areas. Currently, many solutions aim to deal with litter, but the majority focus on litter in water. Although this is a great step forward in tackling a serious issue, more work must be done towards tackling litter on land.

We need to change the way we design, produce, use and dispose of plastics. By working with all levels of government, industry and all Canadians, we can have a strategic, sustainable and efficient waste disposal management system. That's where the A.L.T.R (Adaptable Litter-Taking Robot) comes in place!

### **A specific problem being addressed and the overall goal**

#### *Problem:*

How can we treat the prevalent issue of litter in our community through a method that is adaptable to various terrains, sustainably powered, relevant to stakeholders, and compatible with society in circular design?

*Our Current Goal:* How can we design and create a prototype robot using raspberry Pi which is mobile, simple and realistic to pick up trash more efficiently than a traditional trash collection method?

### **The mechanism to solve the issue**

#### *Tools we will need:*

- A collection mechanism to pick up the trash (claw, gripper, suction etc.)
- A chassis that can transport and store the trash, a collecting mechanism and other components (power supply, motors etc.)
- A detection system to know where the trash is to pick it up

- A software system to control how the robot moves detects and picks up the trash.

*How this solves the problem:* The robot will be able to travel to litter in a select area and collect it. This will reduce the different impacts of litter on society, while providing value to stakeholders. A.L.T.R is a treatment and analytic preventative solution, helping inform

### **Target audience**

The target audience intended for this product is government officials, people in polluted areas, tourism agencies and people who land. Government officials are the target audience because they have control over the permits and regulations over how A.L.T.R can be deployed publicly. They also could provide essential funding as clean cities would be to their benefit. People in polluted areas would also be a target audience because they can empathize (Pathos) with the product's ideals and solution that it provides. They could also be the people who can advocate and fund the product in efforts to make their local area a better place. Furthermore, tourism agencies also are a target audience because they profit from cleaner sightings and area since their LTV of customers go up and bring great reputation to their program. However they do not have much control over how the government keeps their tourist areas clean and welcoming. However this product can give something the tourism agencies can fall behind, in an effort to maintain their good reputation and profits in tourism. Lastly, people who own land would also be a focus of our advertisements since land maintenance costs a huge amount of money, especially with huge land masses that are hard to regulate as one single person. So a relatively cheaper option of automated robots being able to prevent litter from ruining land, would be of much interest to people who own the land.

## **Stakeholders**

- **Tourism Companies**

- Many tourism companies like to keep their attractions clean so that they look more appealing to the visitors

- **Manufactures**

- Many manufacturing companies use recycled materials and use it to make other products

- **Private companies**

- Other stakeholders could be people who own private properties and can use this product to keep their property clean

## **Feasibility of the product**

### **Associated costs (See Canvas for further detail)**

Brain Interface (Raspberry Pi, Arduino, CPU, etc...)

Hardware (Microcontroller, Camera, Sensors, Motors, Battery)

Materials/Shell (Aluminium, Acrylic, etc...)