A.L.T.R (Adaptable Litter Taking Robot)

Subakrish Balakumar, Arush Gupta, Ayaan Salim, Shayan Siddiqui, Zaid Din

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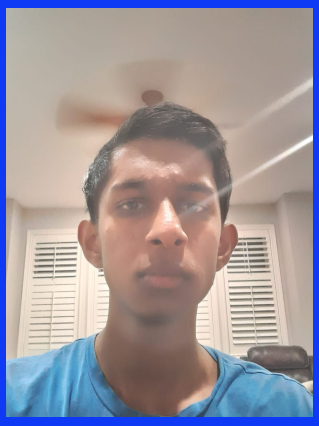
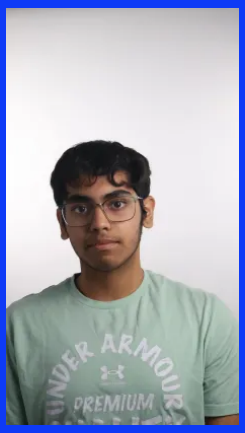
Overview

Introduction



Subakrish Balakumar
Gr.11 I-STEM Student in Aldershot School.



Arush Gupta
Gr.11 I-STEM Student in Aldershot School.

Shayan Siddiqui
Gr.11 I-STEM Student in Aldershot School.

Ayaan Salim
Gr.11 I-STEM Student in Aldershot School.

Zaid Din
Gr.11 I-STEM Student in Aldershot School.

Our idea is with the A.L.T.R. is to help revolutionize the process of being able to reduce land litter in society with an efficient, sustainable method which is adaptable in a multitude of different terrains. The robot's final iterations will help it become more effective in taking care of getting rid of land litter than human ability.

Problem

The issue our business aims to address is the significant amount of land litter in public areas, particularly evident in urban spaces like Downtown Hamilton, where trash is everywhere. This litter poses safety concerns, environmental damage, and health hazards, affecting the overall aesthetic of public spaces. Massive statistics underscore the severity of the problem, with the US accumulating over 51 billion pieces of litter annually, costing approximately $11.5 billion per year to clean up. Plastic pollution makes this problem worse, with Canada generating 4 million tons of plastic waste yearly, of which only 9% is recycled. Most of this plastic ends up in landfills, polluting parks, beaches, and streets, harming wildlife and ecosystems, contaminating air, water, soil, and even our food. Addressing plastic pollution is crucial to strengthen sustainable economies, create jobs, combat climate change, and protect biodiversity. With initiatives like the A.L.T.R. Robot, cleaning up litter in our cities can contribute to a cleaner world.

Solution

The A.L.T.R. Robot will help to bring to the market and to society a more effective sustainable solution towards being able to collect trash, debris and any other type of scraps better than the human ability. The features which the A.L.T.R. Robot provides are that, it is able to go across a variety of different terrains allowing it to access more areas to collect this land litter. The robot also contains a robotic claw and carrying systems which helps to effectively collect the trash/debris in most situations. The design of the robot allows it to be more durable with it's 3D printed design also allowing the product to be cost-effective as well.

Summary

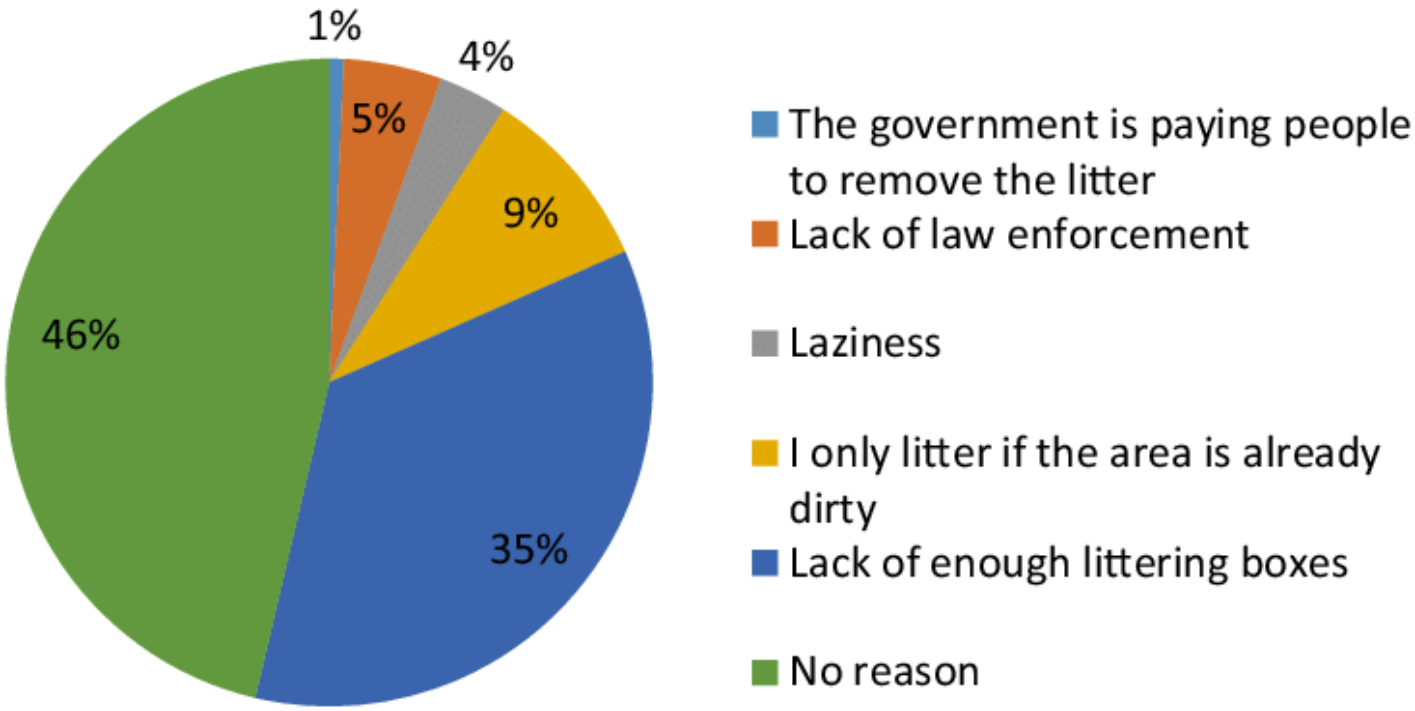
When looking back at how the A.L.T.R. Robot will help reduce the impact land litter in society, we can see that it will provide the a very effective sustainable solution currently to this problem. As it's a very overlooked problem, the robot will be able to provide the proper technological advancements needed with a cost-effective solution for disposing of the trash on the streets. The goal is to help eliminate the environmental concern of land litter altogether in today's society. Having the ability to move on multiple terrains allows the A.L.T.R. robot to have more versatility amongst other solutions. There's competition to building the robots however we seem to be building upon a new marketing trend which can help allow to spread more awareness of this immensely big issue across the world.

Problem Description

The next section details the methodology that will be used to collect and analyze data. This includes the research design, data collection procedures, sample selection, analytical techniques, and ethical considerations where necessary. The methodology section provides the plan for how the research will be conducted and defends the chosen methods as appropriate for addressing the research question.

With this being a topic which isn't considered about all the time, there are still some market trends which come with building solutions for this issue. Some of the main ones currently which we are tackling with our solution are, focusing on sustainability, applying technologies, as well as trying to make this as an emerging market as this is still a massive problem that the world needs to fix up. With our design, it allows us to meet these market trends and standards. For green house agriculture sector, the biggest problem is labor shortage and QA inspection of infection of plants . Using the robot with AI we can solve this problem

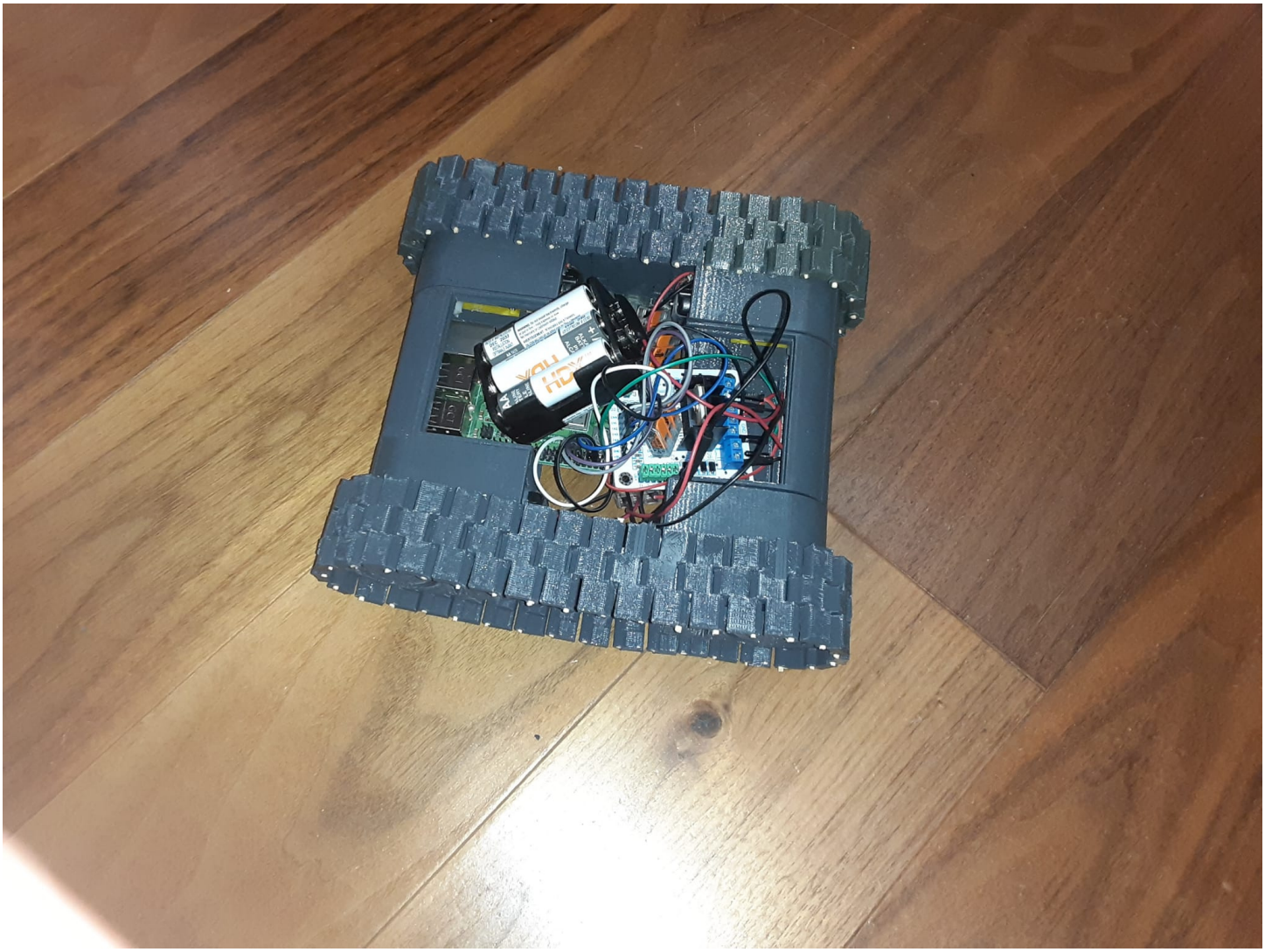
Market Research

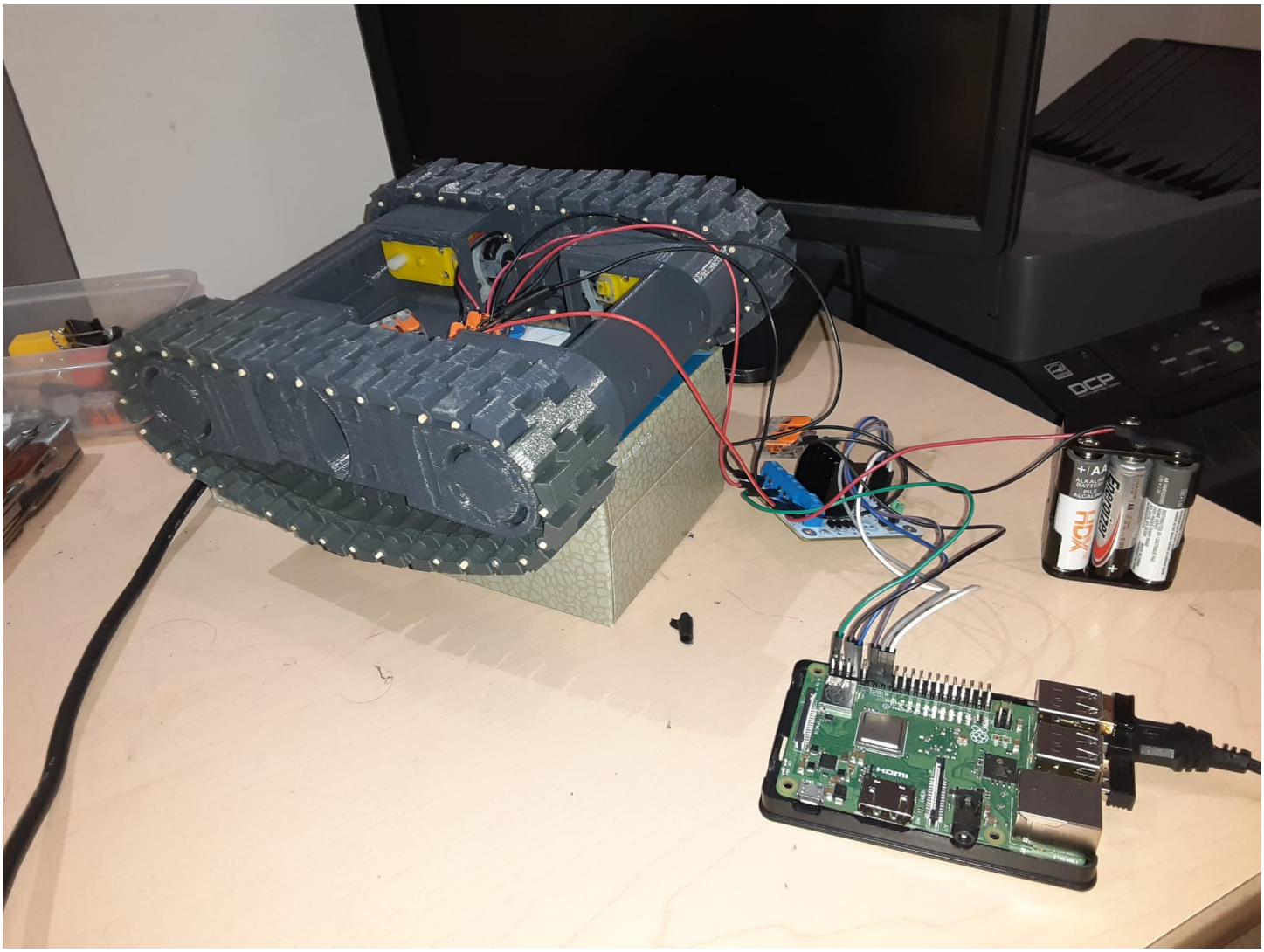


Considering below are the reasons people seem to litter, and with half of those people having no reason or laziness for littering. It is clear that the act of throwing away your trash into the proper designated zone is so undesirable. However another research study showed where they surveyed Americans on if they feel littering is wrong. The response was a overwhelming 90% of people agreeing in the fact that littering is a wrong act. Now since we have this discrepancy in people who believe it is wrong but do not have the action to support their cause. This is why we many people will be fully ready to support the idea of a robot that could help work for their cause without them needing to change their habits. Now to prevent over reliance on this product, we have measure in place in which the robot will collect data for the trash it collects. If it finds certain types of trash or certain areas seem to litter more, this data can be used for legislation and regulation around littering in those areas.

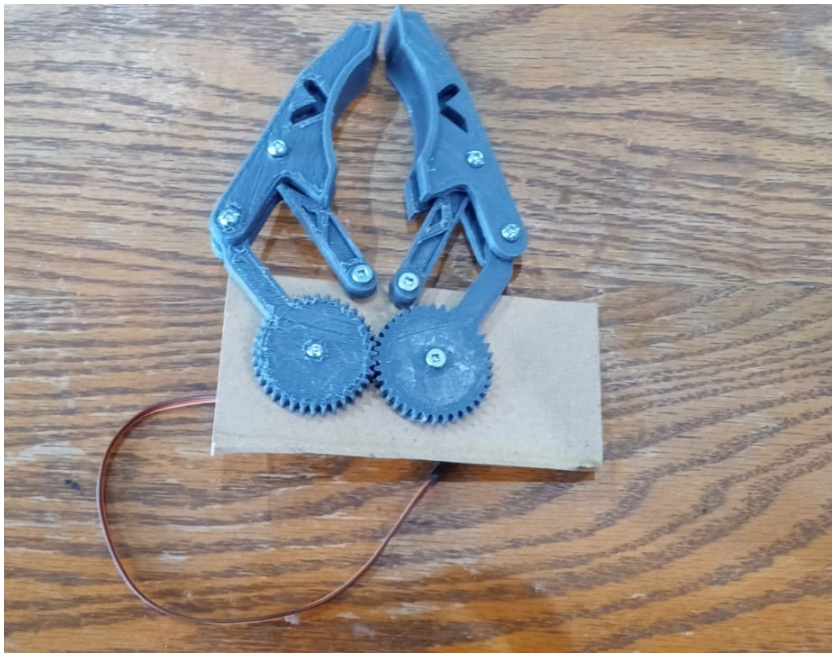
Product

The A.L.T.R is a multifaceted tool to achieve various objectives. The rugged track system allows it to adapt to different land terrains in many weather conditions. 4 strong DC motors power the current prototype. Each of the motors working in pairs is connected to a section of the motor driver (powered by a 9V battery), which helps input what set of motors turn forwards and/or backwards. Finally, the motor driver is controlled by the Raspberry Pi 3 Model B+, which is the brains of the system. The Pi takes the directional input from the Python code to control what direction it moves. The Raspberry pi is powered by a rechargeable portable battery pack.





The additional method we currently have to pick up the trash is a simple claw connected to a servo motor.



Future additional parts are a towable storage system, a camera system that works with AI to detect and analyze the trash/surrounding location and a method of green energy to power the machine (solar panels or rechargeable batteries power through hydro, wind or biofuel energy).

In regards to competitors, our project is superior to existing solutions like DustBot and other beachside trash cleaning robots due to it's various value propositions: It can travel on all terrains, it implements AI and machine learning to work autonomously and it is powered with green energy.

Future Considerations

With this being a topic which isn't considered about all the time, there are still some market trends which come with building solutions for this issue. Some of the main ones currently which we are tackling with our solution are, focusing on sustainability, applying we knew that there ware many technological advancements which we could use and we did with making a remote-controlled robot which has really good mobility and claw interface allowing it to effectively take care of trash or debris in its path making a really effective, sustainable and reusable solution.

Next Steps	Assigned to	Status	
Acquire AI Integration Into The Robot's Core Features	Product Development Team	☐ ☑ ☐	**Resolved** **Pending** **Parked**
Implement Additional Functionality for Crops with Research	Research Team & Product Development Team	☐ ☑ ☐	**Resolved** **Pending** **Parked**

For many of the future consideration which we wish to look into, one of the most crucial ones is to make it automated with an interface or AI so that it does not need to be manually controlled by a user. This is one of the biggest goals which we wish to achieve with this product. We would also like to have it be able to take care of collecting crops being able to integrate an Artificial Intelligence into a camera system which can help detect the ripeness and/or infections in the crops as well. We are looking into gaining more funding in the future with government grants similar to ones such as the "Green Energy Grant" and implement further additional features to the A.L.T.R. robot for the time ahead.

Contact Information

We would love to hear from you!

1balakumasub@hdsb.ca | 1guptaaru2@hdsb.ca | 1siddiqusha3@hdsb.ca | 1salimaya@hdsb.ca | 1dinzai@hdsb.ca