SUSTAINABLE CAPSTONE PROJECTS [SCAP]
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Haydraulic Robot Arm

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INTRODUCTION

Hyadrualic Robotic Arm (concept) is all about using eco-friendly hydraulic fluids controlled by the syringes to move the robotic arm manually. The concept of this hand is to be able to move around waste materials without coming to direct contact with it and using sustainable materials. It can work for transporting material from one place to another but that would be limited by its size.

Motivation for creating this mostly stems from the need to transport materials that cause difficulties when it comes to handling with ease, or, a simple fun way of getting rid of trash materials to motivate fellows to keep the enviroment clean.

MATERIALS USED IN CONSTRUCTION

Re-Used/Recycled Materials:
- Battery
- Wood pieces
- toothpicks
- Cardboard
- Syringes (10 ml x8)

Other Materials:
- Tubes (2m)
- Paint (for the coloring) x4
- Superglue

FINAL PRODUCT

Our final version of the Robotic Arm basically works by filling the 4 main syringes that control the movement of the arm. A total of 8 syringes was used. 4 in the arm connected in such a way to control the pivotal points of movements, ranging from the structure up, moving it around from the base, and of course, controlling the gripper's movement. Each one of the main control syringes is responsible for moving its adjacent pivot.

Plenty of failed attempts were crucial for our final prototype. Issues were mostly with using cardboard, which we really wished to use, however we had to switch to wood when it came to the arm itself because the cardboard would end up breaking. Regardless of the base itself being made with wood at the end, multiple failed attempts happened while placing the joints.

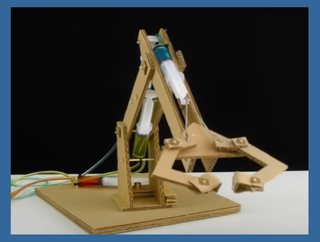


Figure 1. Prototype reference.

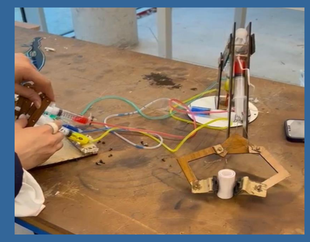


Figure 2. final result.

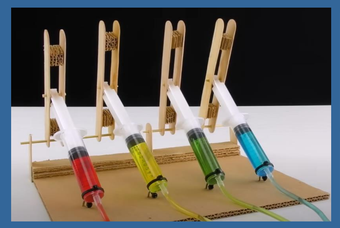
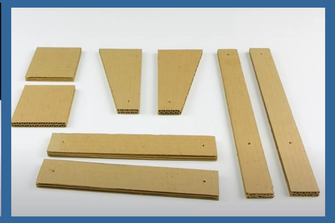


Figure 3. Control Syringes.



Mats 1. Cardboard measurements.

RESULTS AND DISCUSSION

Our hyadraulic arm is a small, functional piece of a hopefully future design created for larger scales. For now, it is only able to deal with small-medium sized trash / lightweight materials due to its small size and ratio. Hopefully, in the near future on larger scales, lifting heavy, large pieces of materials (whether to simply carry them from place to place or get rid of them without direct contact/much effort) will be possible, and of course, using only sustainable things. Examples of where a large-scale hydraulic arm might be used is in construction sites or elevators.

CONCLUSIONS

- Hydraulic arm robots offer several advantages over traditional robotic arms.
- They have good force and power density, making them suitable for use in actual disaster environments OR simple enviroments.
- Hydraulic actuators can handle high pressures and can easily move backward when needed, making them very versatile for robotic applications.

REFERENCES

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