Mechatronics ES-408

Pick And Place Bot

Team Member

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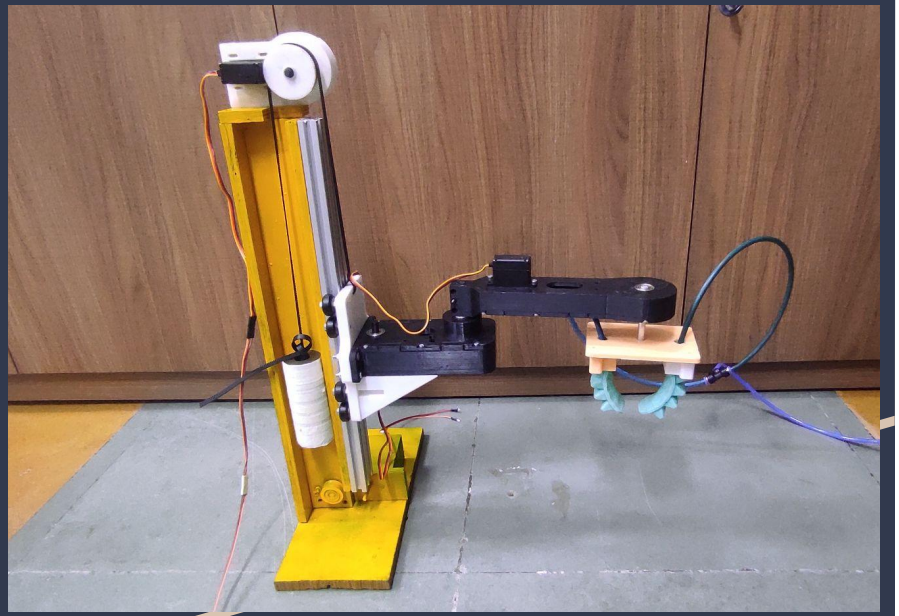
Problem Statement

- In a tea bags production company, in packaging faction, there is a need to automate the process by replacing the human by more efficient and sustainable solution.

OBJECTIVE

- Develop an effective gripper mechanism for secure handling and transfer of tea bags to increase speed, reduce manual labor, and improve overall accuracy in tea bag packaging.

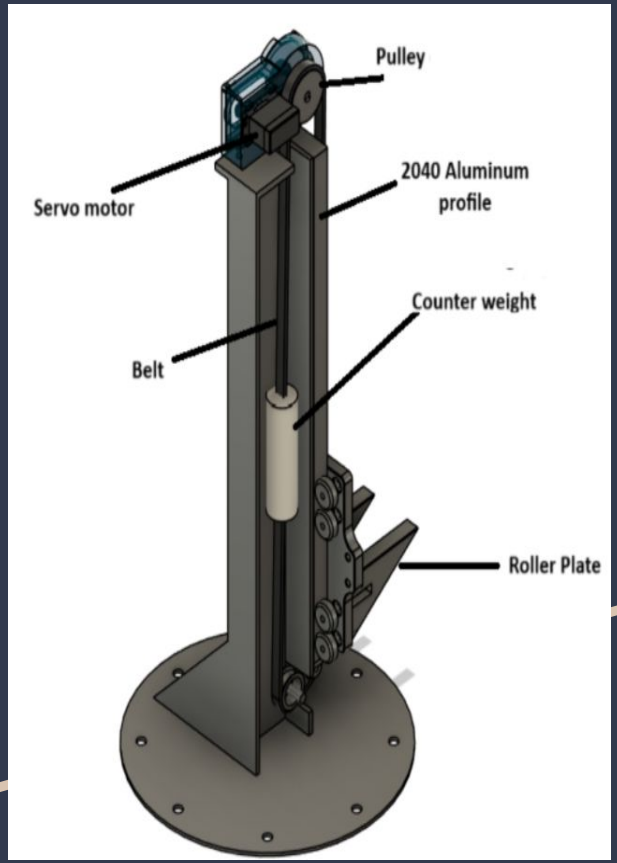
❑ Solution



A PRR Manipulator

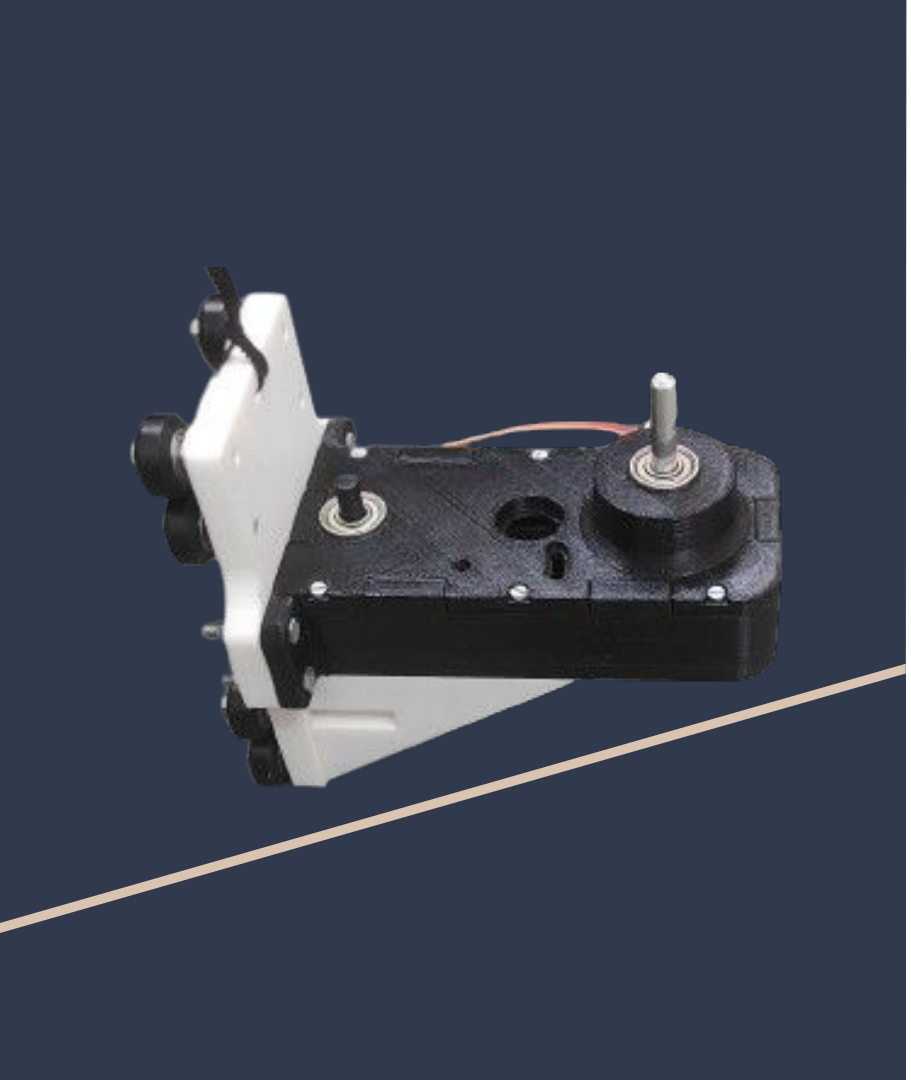
Reference

https://github.com/IVProjects/Engineering_Projects



Prismatic Joint

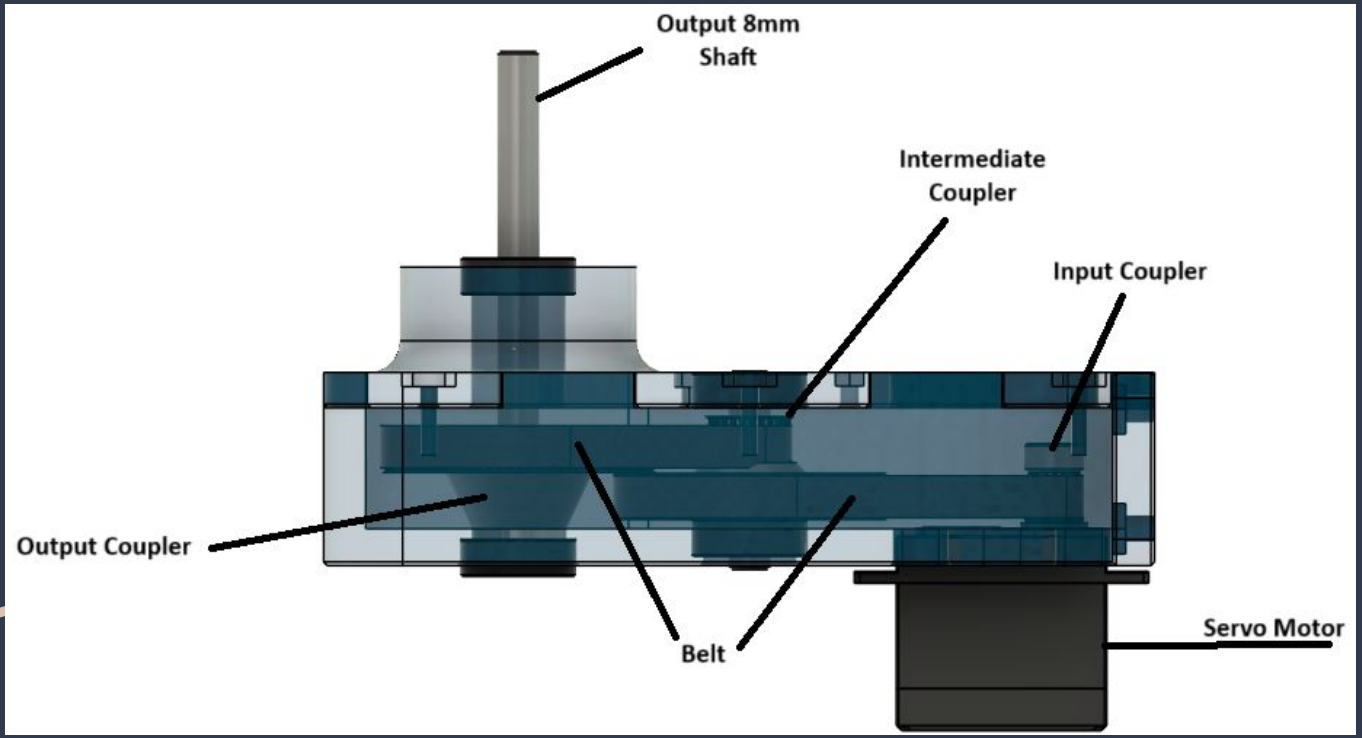
- Responsible for adjusting the vertical height of the gripper.
- The belt holds roller plate and counter weight passing through pulley.

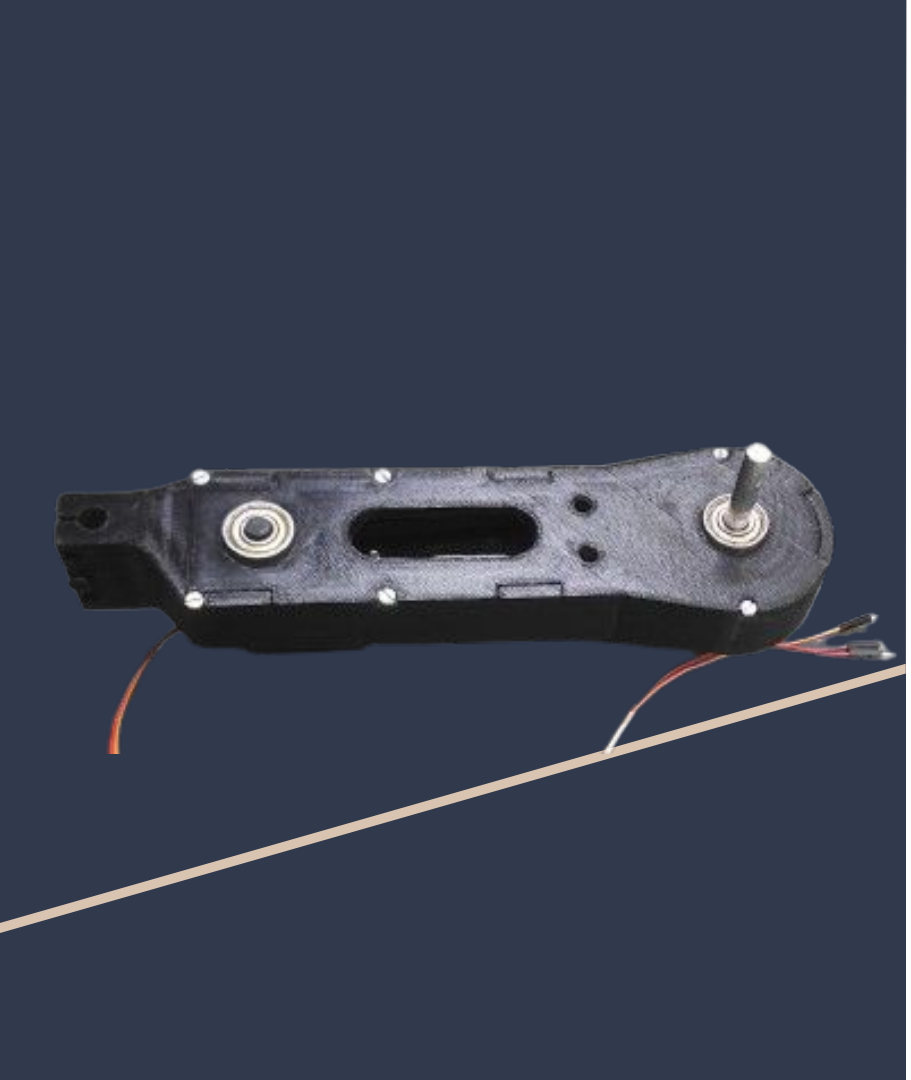


1st Revolute Joint

- Positioned between Roller Plate and second link of the PRR manipulator.
- It is fixed on the roller plate.

1st Revolute Joint

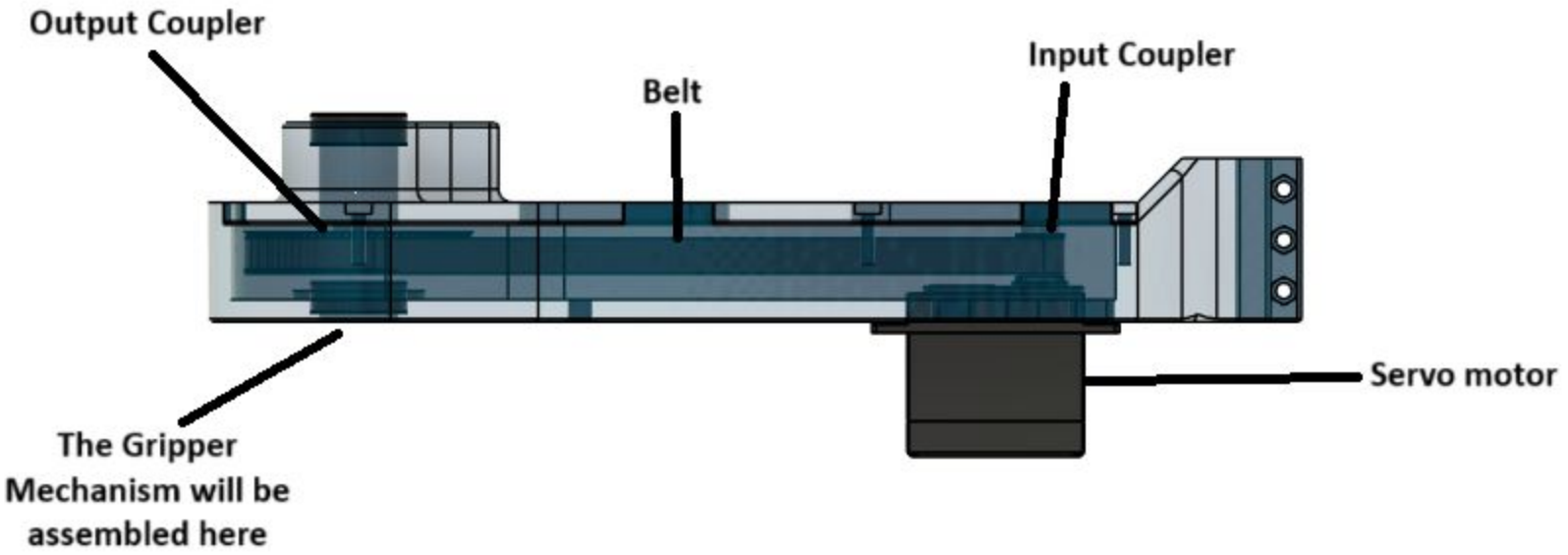




2nd Revolute Joint

- Connects the gripper with whole PRR system.
- This DOF helps in orientation of the gripper wrt object for proper function.

2nd Revolute Joint

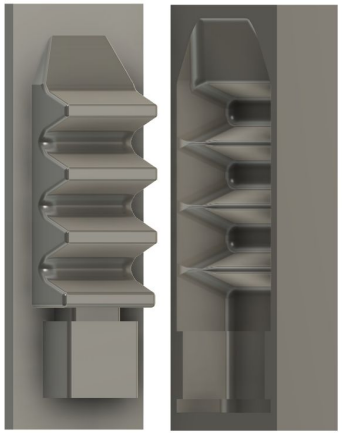


Soft Gripper

- Pneumatically actuated
- Two finger
- Delicate handling, Shape Adaptability

Molding process

- Use 3D printed mold for shaping the silicone finger.
- Pour moldcast solution into the mold.
- Allow the mold to rest for 3 hours for proper curing.



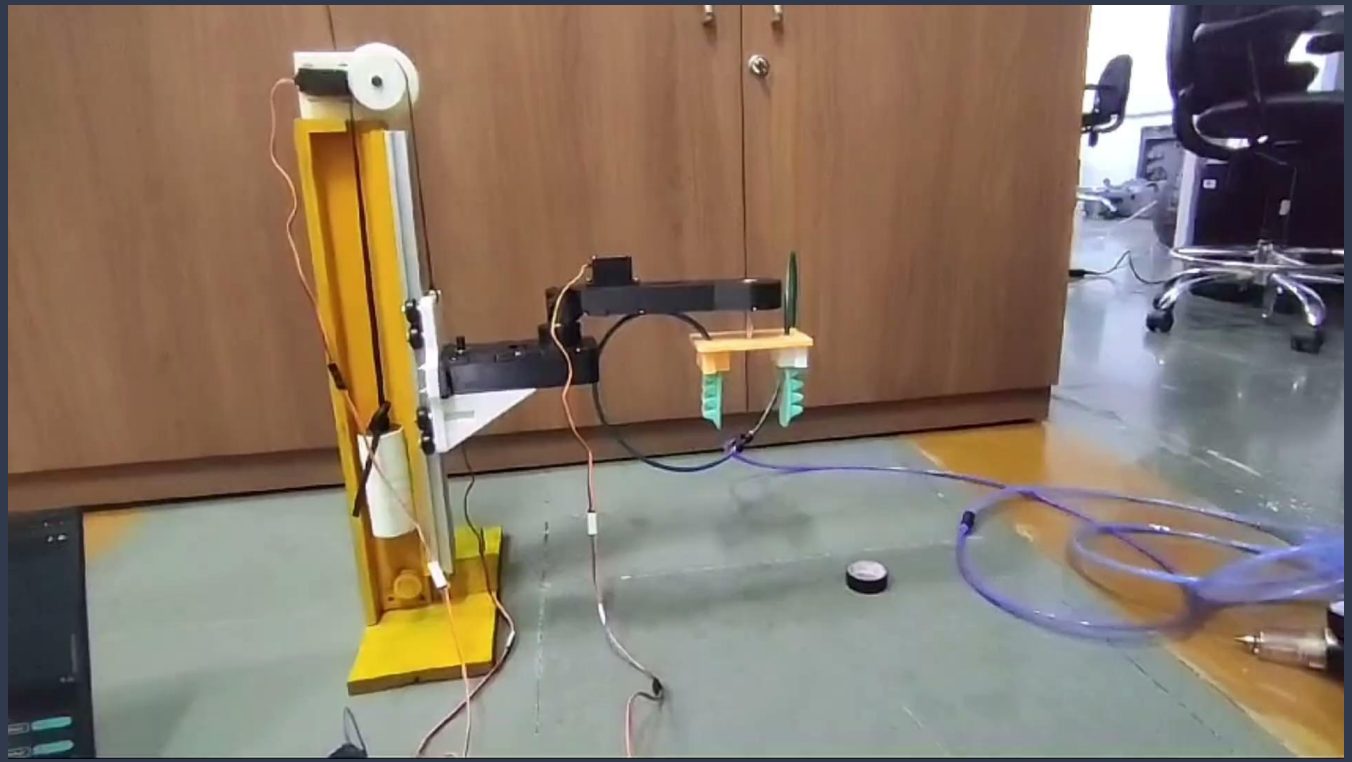
Finger mold

Finger

Actuation

- Using air compressor, solenoid valve
- Using electro pneumatic regulator

Visual Representation of Final Prototype



Future Development

- Use camera for position detection and orientation identification of object
- Incorporate tactile and pressure sensors
- Explore advanced silicone composites for increased durability and flexibility.

THANK YOU!