Industry Projects Submission 1

ME 639 - Introduction to Robotics

IIT Gandhinagar

Group Name: Bots
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We attest to abide by the stated collaboration policy: We understand that all sorts of collaboration are allowed, however plagiarism will not be tolerated. If we use material from some other source (or from friends), we will cite them appropriately.

Pill-Picking Robot

Statement of Our Understanding of the Project

Pill picking robot is a project provided by Timetooth. Timetooth wants to build a robot which is able to pick pills/capsules for pharma industries. In the pill picking robot project, we are supposed to design a robot of a particular DOF that can hold and pick any object (like pill) from an open cup. A single pill is to be picked at a time. We would also have to work on the actuators and the actuating mechanisms that would control the Robot. We also have to go through single DOF fully actuated and underactuated sensors as a part of this project.
As a new gripper mechanism, we are thinking of using a soft robotic gripper as in this case we would be able to gently pick them regardless of the shape of the pills. Also, the shape of the pill would not get affected and the pill won't be damaged in the process. We also have to design a control strategy for the picking mechanism mentioned above.

Tentative Approach and Tools we May Need to Use

We will start with synthesizing the mechanism with respect to the required DOF, purpose, grounding positions and number of links. Then we will focus on designing a suitable gripper for the robot. Initially, we are considering soft robotic grippers/ universal grippers.

Key Assumptions Made in Approaching the Problem

1. Considering 3-DOF mechanism
2. 1-DOF gripper
3. Linear actuators

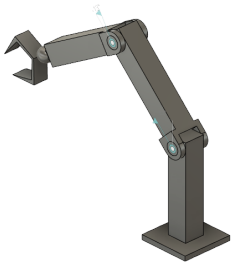
Key Questions to Clarify the Requirement of the Project

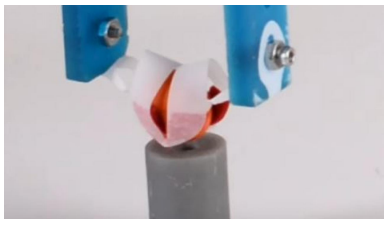
1. Expected trajectory and use
2. Expected DOF
3. Any particular actuation mechanism
4. Can vacuum gripper be used

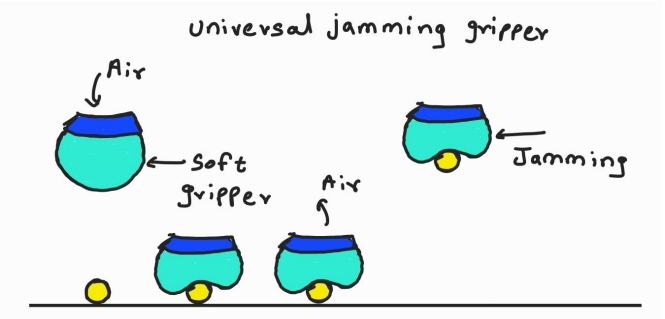
Expected list of Deliverables

1. A brief explanation of the concept (including the type of robot, number of links and joints, and other such details
2. Figures/drawings/sketches showing the concept
3. Relevant equations of the robotics solution
4. Codes incorporating the solution
5. Representative plots/or other representative results from the codes
6. Explanation of the solution and the results

A Highly Tentative Sketch of the Problem and Expected Solution







This is a RRR robot with a mechanical gripper at the end-effector position. We can have a soft robotic gripper or Universal jamming gripper as end effector.