Industry Projects Submission 1

ME 639 - Introduction to Robotics

IIT Gandhinagar

Group Name: Bots
Names of Group Members:
Prathamesh Vibhute (18110186)
Shardul Kulkarni (18110088)
Nikhil Murkute (18110104)

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 works on an exoskeleton specially designed for handicapped people. 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.
Pill picking robot will be attached to the currently available exoskeleton. The trajectory followed by the robot should not harm the user using the robot. 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 vacuum gripper as in this case we would be able to control forces applied according to the weights of pills. Also, the shape of the pill would not get affected 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 after calculating the dynamics equations we will try to implement the individual joint control. Initially,

we are considering mechanical grippers/soft robotic grippers/ vacuum grippers for the end effector.

Key Assumptions Made in Approaching the Problem

1. Considering 3-DOF mechanism
2. Ground links of the robot at hand level
3. Linear actuators

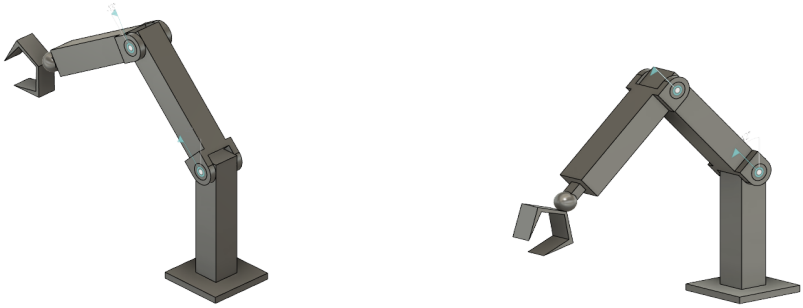
Key Questions to Clarify the Requirement of the Project

1. Expected trajectory and use
2. Position when robot would be attached
3. Any restrictions on the number of links used
4. Any particular actuation mechanism

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 also have a vacuum gripper at the end.