

# Industry Projects Submission 1

ME 639 - Introduction to Robotics

IIT Gandhinagar

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Group Name: Bots

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## 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. Trajectory followed by the robot should not harm the user using the robot. We would also have to work on the actuators and actuating mechanism 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 weights of pills. Also the shape of the pill would not get affected in the process. We also have to design control strategy for picking mechanism mentioned above.

### Tentative Approach and Tools we May Need to Use

We can start with synthesizing the mechanism with the help of DOF, grounding positions and number of links. Then we would iterate through different positions of ground links and lengths of links to get a suitable trajectory. Initially we are considering mechanical grippers and 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

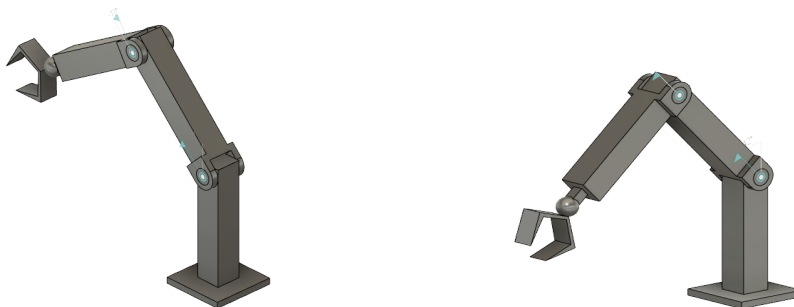
## Key Questions to Clarify the Requirement of the Project

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

## 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. CAD drawings
7. Explanation of the solution and the results
8. Statement about limitations and future recommendations

## A Highly Tentative Sketch of the Problem and Expected Solution



This is RRR robot with a mechanical gripper at the end effector position. We can also have a vacuum gripper at the end.