MFET 348 - Project Proposal

Tristan Brideweser

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Project Description

The goal of the project is to rack dishes after they have been washed in a commercial grade dishwasher with a Fanuc robot, as illustrated in Figure 1

Figure 1: Robotic arm washing and racking dishes

Scope of Work

Utilizing the robotics-toolbox-python package,

1. Establish the end-effector frame
2. Identify DH parameters
3. Establish the transformation matrix from the end-effector frame to the robot base frame for a specific configuration
4. Establish transformation matrix from the starting frame, F_s to the racking frame, F_r
5. Simulate robot motions of picking up dishes from a commercial dishwasher and placing into a rack

Principles/Techniques

Spatial description and transformation

Forward kinematics

Inverse kinematics

Jacobian

Velocity Relations

Trajectory Planning

Timeline

Week	Goals
10/25-11/1	Practicing with toolbox for Python
11/1-11/8	Developing a virtual representation of the robot
11/8-11/15	Programming robot to perform task
11/15-11/22	Testing ability to perform task
11/22-11/29	*Creating small scale prototype
11/29-12/6	Preparation for presentation and complete report

*if time allows

Team

The project will be completed individually.

Budget

No money should be spent. However, a small prototype may be created if time allows.

Conclusion

As a data scientist, applied statistician, and industrial designer, this project will enhance my robotic programming skills by using the Robotics Toolbox designed for Python. I will broaden my skills and ability through a more detailed understanding of industrial robotic design, programming, and prototyping.

References

Peter I. Coke, Robotics Toolbox for Python,
https://github.com/petercorke/robotics-toolbox-python

User's Manual of Fanuc robot (model #: LR Mate 200iB)
http://web.ics.purdue.edu/ diaox/mfet24800/Fanuc%20robot%20programming%20and%20user