Institute of Field Robotics, King Mongkut's University of Technology Thonburi
126 Pracha Uthit Rd, Bang Mot, Thung Khru, Bangkok, Thailand 10140
Senior Thesis FRAB (FIBO Robotics and Automation: Bachelor)

A study of Torque-Control system on UR5 for the drawing task

Jirattanun Leeudomwong, 66340500009
Bharut Aursudkit, 66340500040
Nuttapruet Puttiwarodom, 66340500018

Abstract
Industrial robot manipulators have countless applications nowadays. One of the basic tasks to test the accuracy of a robot manipulator is to perform a drawing task, which can be done with only position control alone. This project focuses on using a UR5 industrial robot manipulator to perform the drawing task. The challenge this project represents is controlling the force between the pen (end-effector) and the canvas using torque control while following a trajectory generated by the image processing method. This project is running on Gazebo Ignition physics simulation and using ROS2 as a middleware.

Keywords: Torque control, Dynamics model, Trajectory generation, Image processing, Edge detection, ROS2, Physic simulation

1 Introduction

This topic will explain about what do the contribution of this work and what each topic will cover

2 Trajectory generation

This topic will explain about the methodology of trajectory generation and result

3 Inverse Kinematic

4 Dynamics and Control system

5 Test and Evaluation

6 Conclusion