Thesis Project: Investigating State of the Art Grasp Calculation for Autonomous Commissioning Robot Systems

Description

As part of a current research project, the Chair of Materials Handling, Material Flow, Logistics (fml) is developing an autonomous commissioning robot in order to research automated picking and placing using intelligent robotics.

In this context, a major problem is the robot's ability to determine an optimal grasping point for different objects within a broad objects spectrum. Due to the high importance of grasping to enable interactions with the environment, grasping research developed a lot of different approaches and techniques, using conventional methods, modern machine learning and deep learning techniques.

The aim of this work is to determine which of the current state of the art grasping techniques fit logistics requirements the most. First an extensive literature research to gain an overview is conducted. Next, logistics specific requirements are compared with the techniques and first rankings are derived. Subsequently the remaining techniques are implemented in software. In order to ensure smooth operation despite the ongoing pandemic, the implementation is carried out in simulation as a first step. Finally, a comparison of the different techniques using the previous ranking and simulation results will create a in depth overview of the current State of the Art in grasping which is meaningful for our autonomous commissioning robot.

Our current setup includes a FrankaEmika Panda robot arm simulated in Gazebo which is controlled via ROS/Movelt and the pick and place pipeline. Lastly, The documentation in the form of a thesis concludes this project.

Requirements

- High degree of independence and reliability.
- Knowledge of a programming language (e.g. Python, C++)
- Knowledge in ROS (Robot Operating System) is a plus

Application

You are interested? Please send your CV, cover letter and a current evaluation sheet to dimitrij-marian.holm@tum.de.
If you are a fluent german speaker you can also send your application in german.