UNIVERSITY OF SOUTH FLORIDA

Major Research Area Paper Presentation

Developing Technologies for Robotic Multi-objects Grasping
by
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For the Ph.D. degree in Computer Science and Engineering

Grasping multiple objects at once from a pile is common for humans, and it makes us efficient. However, picking a single item at a time has been standard practice in robotic bin-picking and pick-and-place applications. It is essential for a robot to gain multi-object grasping capability (MOG). To do so, a robot needs to make a grasp in a pile, sense the number of objects in the grasp before lifting, and predict how many will remain in the grasp after lifting. The prediction is a very challenging problem because when making the prediction, the robotic hand is still in the pile and the objects in the grasp are not observable to vision systems. Moreover, some objects in the hand before lifting may fall out the grasp when the lifting starts because they were supported by other objects in the pile instead of the fingers. In this presentation, we will mainly focus on introducing our novel multi-object grasping analyzing methods. They include a grasp volume calculation, tactile force analysis, and a data-driven deep learning approach. The methods have been implemented on a Barrett hand and then evaluated in simulations and a real setup with a robotic system. The evaluation results conclude that once the Barrett hand grasps multiple objects in the pile, the data-driven models can make a good prediction before lifting on how many objects will remain in the hand after lifting.

Wednesday, June 22nd, 2022
9:00 AM
Online (Microsoft Teams)

THE PUBLIC IS INVITED

Examining Committee
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