R&D SH@WCASE 2023

Table-Top Rearrangement

ABSTRACT

In the table-top rearrangement problem, we are usually given a fixed table with objects on top of it and a fixed base manipulator to manipulate and rearrange these objects. In this project, we assembled the well-known methods and some custom-designed methods, to create an end-toend framework that can rearrange the objects their corresponding target poses. Our to solution has won the 3rd position at OCRTOC challenge, an official ICRA 2022 competition.

METHODOLOGY

Firstly, we capture images from 6 different poses. We then use SuperGlue to compute the 6D pose of each object in the images. Contact graspnet is then run on the point cloud to generate dense set of grasps. All this information is fed into a heuristic task planner to generate a complete plan. We then execute the plan using RRT-connect.



RESULTS

- importance.
- minutes)





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•Our solution, submitted on 9th of May, secured 3rd position in the OCRTOC table-top rearrangement challenge.

•We were able to achieve higher success rate in the tasks where objects were directly graspable using the near-vertical-grasp approach, and in many non-monotonic instances. However, we fail to handle the cases where collision-checking, and tactile awareness are of great

•Our current solution is slow and often fails to complete the task in the given time period (10

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CONCLUSION FUTURE WORKS

Our vision module was primarily learning-based, but the planning module was still classical. It was observed that the classical planners were good at solving simple tasks. However, they fail to handle complex cases, which involve more than one type of skill. Planner is slow and not easily generalizable in such cases, and enumerating such cases is a tedious task. It is therefore important to replace the classical TAMP module with a learning-based TAMP, which offers speed, and generalizability if trained properly. We are currently working on RL-based manipulation for complex tasks.

ACKNOWLEDGMENT

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