

Self-supervised 6-DoF Robot Grasping by Demonstration via Augmented Reality Teleoperation System

Xiwen Dengxiong¹, Xuetong Wang¹, Shi Bai², Yunbo Zhang¹
Rochester Institute of Technology¹, Figure AI²



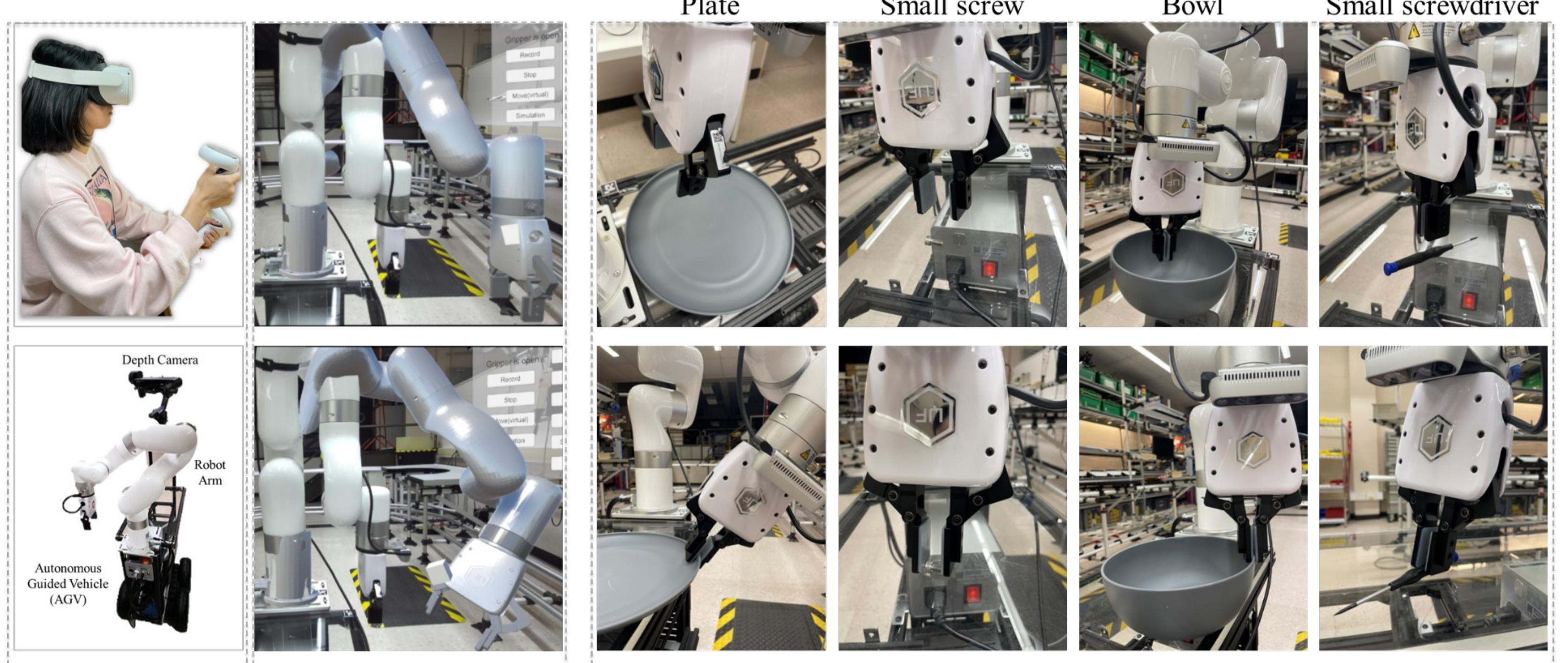
Introduction

Abstract:

- Propose an augmented reality(AR) teleoperation system to collect demonstrations from human.
- Propose a contrastive point clouds learning method that efficiently learns the 6-DoF adjustment solution within 3 demonstrations
- Experiments on over 200 objects, the robot gradually learns to grasp objects based on demonstrations

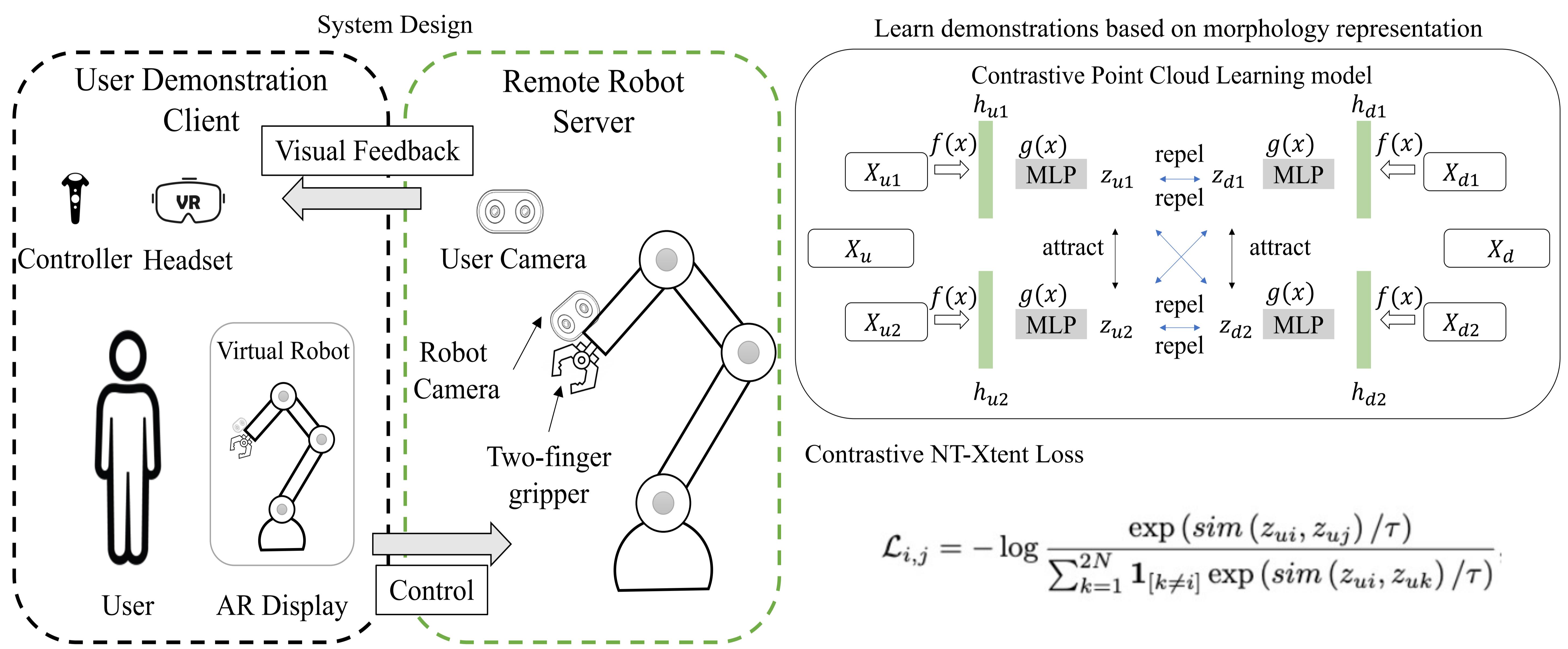
Task:

- Recognize the unknown objects
- User demonstrate how to grasp the object in AR
- Learn demonstration through self-supervised contrastive learning method
- Generate 6-DoF grasp pose



Generating 6-Dof grasp pose based on the demonstrations from user

Proposed Framework



Experimental Result

Object Grasping Experiments



Objects Overview



Implementation Details

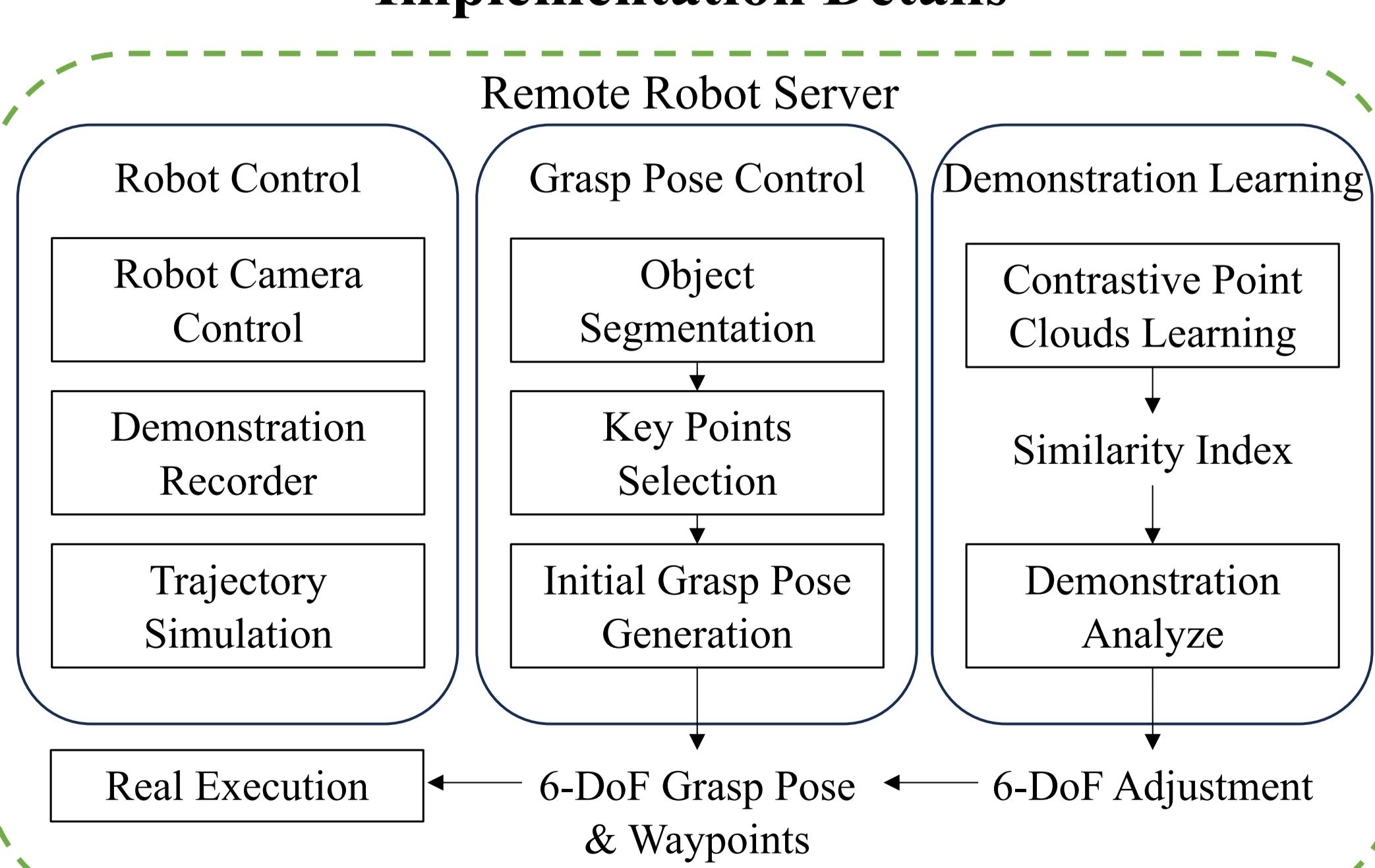
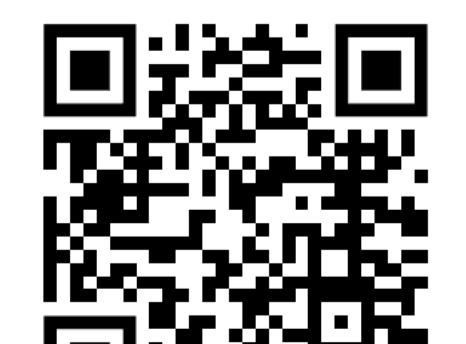


TABLE I
ATTEMPT-CENTRIC SUCCESS RATE FOR 6-DOF GRASP AFTER
LEARNING DIFFERENT TIMES OF HUMAN DEMONSTRATION. "NO DEMO"
REPRESENTS NO HUMAN DEMONSTRATION.

Objects	Attempt-Centric Success Rate(%)			
	No Demo	1 Demo	2 Demos	3 Demos
Hardwares	78.0	87.3	86.7	89.3
Food&Snacks	78.8	85.4	85.8	86.3
Households	59.5	62.5	64.5	65.0
Toys	88.4	88.4	88.4	88.4
All	78.2	80.6	81.2	81.9



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