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Dexterous Manipulation in Industrial Automation

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Motivation

Advancing humanoid research enhances dexterous manipulation, enabling automation of complex tasks like wire harnessing, and improving efficiency in industrial workflows.

Project Description

This project advances robotic dexterity for automating tasks like wire harnessing by tackling grasping, object isolation, pose estimation, and in-hand manipulation. By improving sample efficiency, perception, and control, we aim to enhance robotic adaptability in industrial automation.

RQ 1: How can the sample efficiency of learning-based manipulation techniques be improved?

RQ 2: How can robotic dexterity be enhanced for handling flexible materials like wires?

RQ 3: What are the key challenges in transferring simulated dexterous manipulation to real-world applications?

Bin Picking	→	Object Isolation	→	Pose Estimation	←

In Hand Manipulation	→	Insertion/Assembly

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