

DexWrist: A Robotic Wrist for Constrained and Dynamic Manipulation

1 Introduction

Robot Platform	Human Wrist Kinematics	Torque Transparency	Dynamic Tasks
AgileX PiPER	✗	✓	✓
Universal Robotics	✗	✗	✗
ALOHA	✗	✓	✓
Franka Emika Panda	✗	✗	✗
Unitree H1-2	✗	✓	✓
Unitree G1	✗	✓	✓
DexWrist (Ours)	✓	✓	✓

2 Imitation Learning

We trained RGB-based diffusion policies on 141 expert demonstrations for both the AgileX with and without the wrist. Task success was specified by not only picking the can from the cluttered space, but not knocking over any of the objects in the fridge or coming in contact with the boundaries of the fridge. Policies rolled out on the wrist both completed the fridge task **4.14x faster than those on the default wrist** and had a **50 percent improvement in relative success rate**.

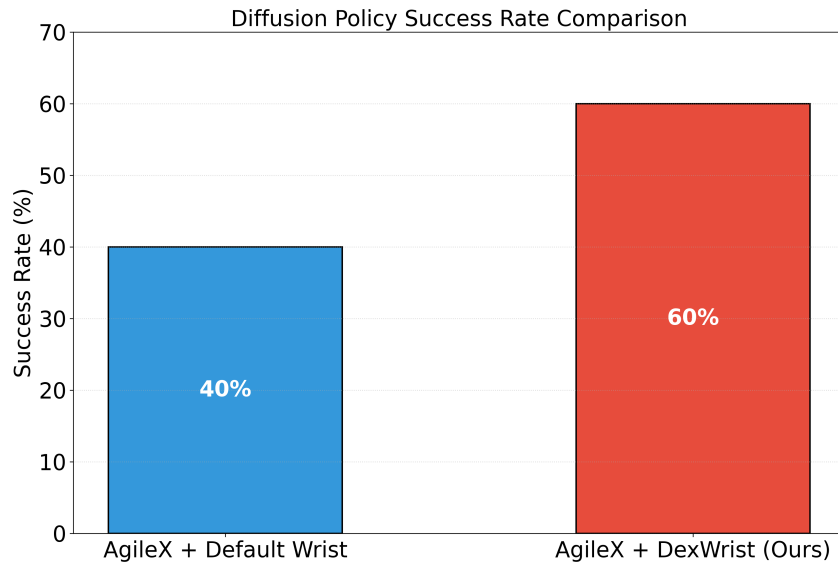


Figure 1: Comparison of policy success rates between Stock AgileX (40%) and AgileX with DexWrist (60%), showing a 50% relative improvement with our DexWrist modification.

More details regarding the experimental setup, videos of policy rollouts, dataset and hyperparameters used can be found [here](#).