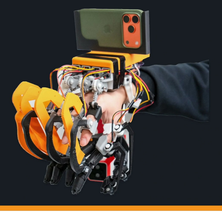
From Hand to Hand: A Shared Wearable Interface and Functional Benchmark for Dexterous Manipulation

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Why WUDI?

Robot hands differ, so demos don't transfer — and wearable interfaces are built for one hand. **One sensorized exoskeleton. Swappable passive hands.**

Wearable · **U**nified · **D**exterous · **I**nterface

One WUDI, seven hands

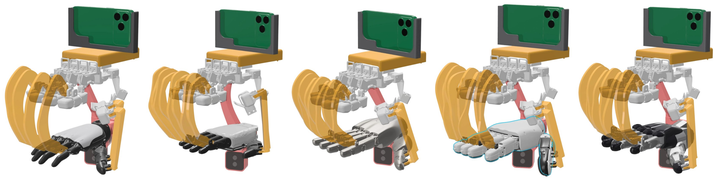
We build and verify on LEAP and WUJI, while using simulation to verify the other 5 designs.

Real-world verified



LEAP Hand · WUJI Hand v1

Sim verified



ROHand · Inspire · Sharpa · XHand 1 · Schunk

Cornell Bowers CIS Computer Science

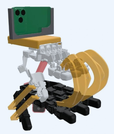
Scan me

Key insights

1 Shared sensing, swappable hands



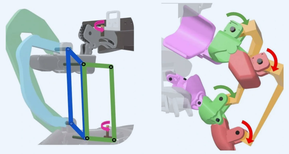
← Exoskeleton →
← Linkage →
← Passive hand →



Shared sensing · **swapped** per hand

System cost ≈ $120	Hand swap ≈ 24 min	DoF 16

2 Accurate joint reconstruction

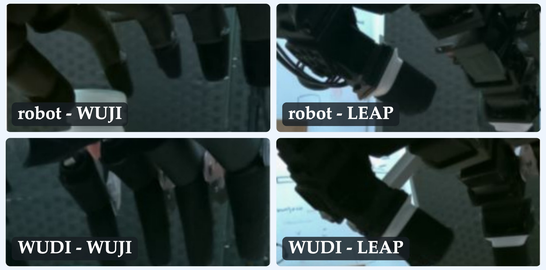


Error vs. mocap (°)

Joint	MAE	RMSE
Thumb		
MCP	3.17	3.97
IP	3.33	4.55
Index		
MCP-AA	2.10	2.89
MCP-FE	4.20	5.50
PIP	1.34	2.33

MAE 1.34–4.20° · RMSE ≤ 5.50° vs. motion capture

3 Same view, no inpainting

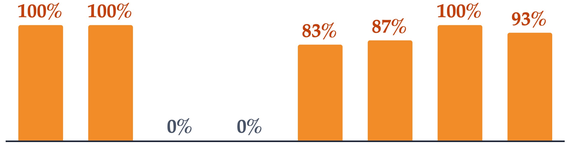


Occupational Therapy-inspired Hand Evaluation and tRaining (OTHER)

Top: bare hand · bottom: **WUDI**

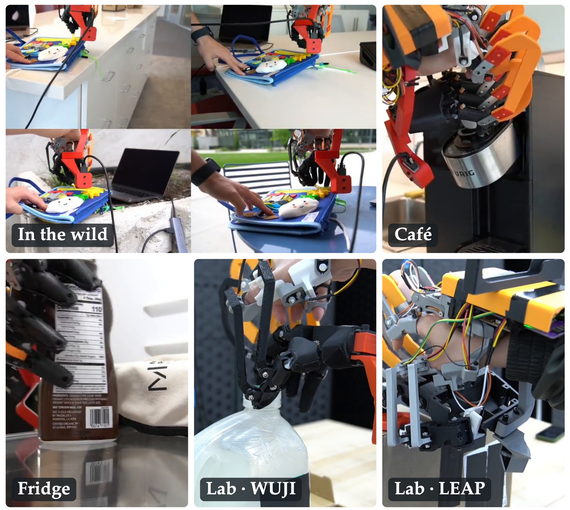


User study · 12 participants · **16.8 s** to put on



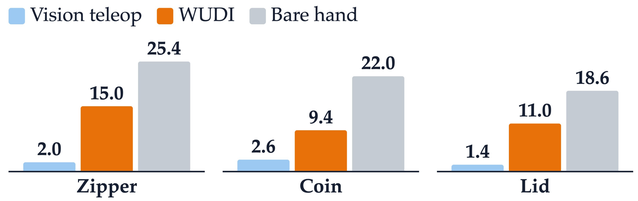
Collect anywhere

Robot-free, portable **WUDI** collection



WUDI vs. vision teleop

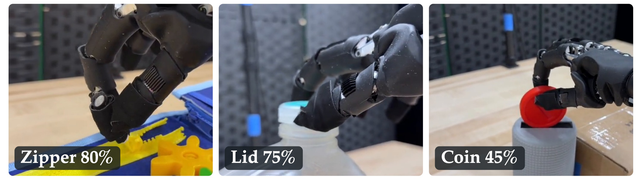
3.6–7.7× more successful demos than vision teleop



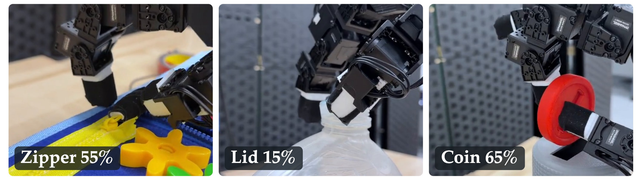
WUDI data → robot policies

70 **WUDI** demos per task → Diffusion Policy

WUJI Hand v1



LEAP Hand



Acknowledgements

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