



TidyBot++: An Open-Source Holonomic Mobile Manipulator for Robot Learning



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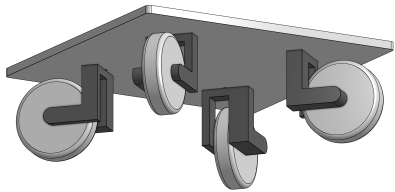
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tidybot2.github.io

Introduction

Most existing mobile bases are nonholonomic, limiting maneuverability.

We propose an open-source, research-friendly mobile base that is holonomic. This simplifies teleoperation and learning of household mobile manipulation tasks.



Tasks



TidyBot++



Open fridge



Wipe countertop



Load dishwasher



Take out trash

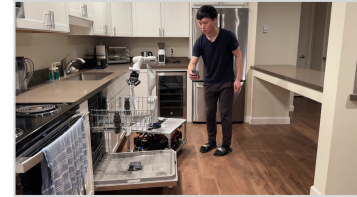


Water plant



Load laundry

Phone Teleoperation

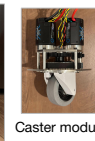
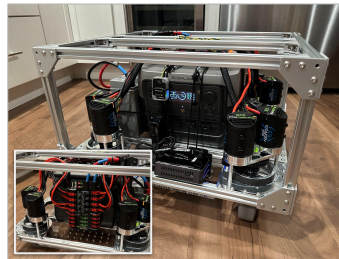


Imitation Learning

Task	Success
Open fridge	10/10
Wipe	9/10
Load	7/10
Take out trash	10/10
Load laundry	7/10
Water plant	6/10

Specifications

Specification	Ours	Stretch	Tracer	Ranger Mini	Husky	Fetch	Tiago
Holonomic	✓	✗	✗	✗	✗	✗	✓
Omnidirectional	✓	✗	✗	✓	✗	✗	✓
Swappable arm	✓	✗	✓	✓	✓	✗	✗
Footprint (cm)	50x54	33x34	57x69	50x74	67x99	51x56	54x54
Weight	34 kg	24.5 kg	30 kg	63 kg	50 kg	113 kg	70 kg
Payload	60 kg	10 kg	100 kg	80 kg	75 kg	—	—
Maximum speed	1 m/s	—	1.6 m/s	1.5 m/s	1 m/s	1 m/s	1 m/s
Runtime	8 h	2–5 h	4 h	7–8h	3 h	9 h	8–10 h
Cost	\$5.4k	\$25k	\$7.6k	\$13k	\$20k	\$100k	\$100k



Caster module



SLA battery



Power distribution



Portable power station

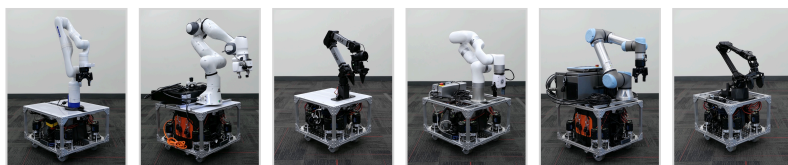


Computer

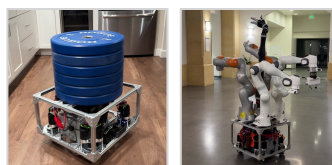


T-slot aluminum frame

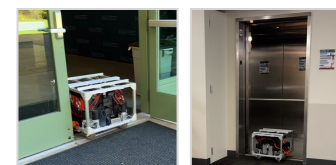
Components



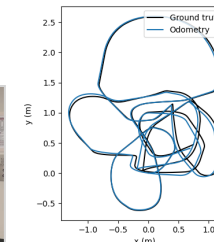
Swappable arm



Payload

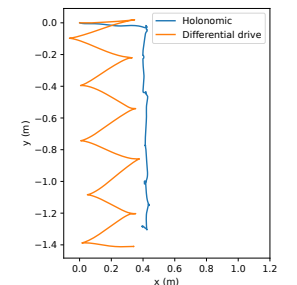


Traversability



Odometry

Differential Drive



On the *wipe countertop* task, differential drive gets only 4/10 success vs. 9/10 for holonomic