

Design of a Low-Cost Platform for Autonomous Mobile Service Robots



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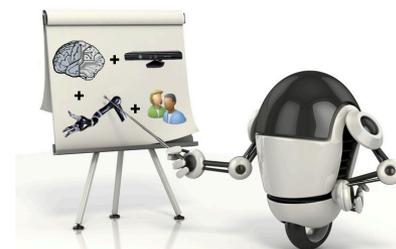


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Motivation

custom platforms

semi-custom

open source



Education

Research

Commercial



Goal: design a low-cost, easily creatable, open source service robot platform

Low-Cost Service Robot Platform

Built on TurtleBot 2 base

Enhanced computation

- Intel NUC core i5 or i7
- COTS external battery

Shoulder-height touchscreen

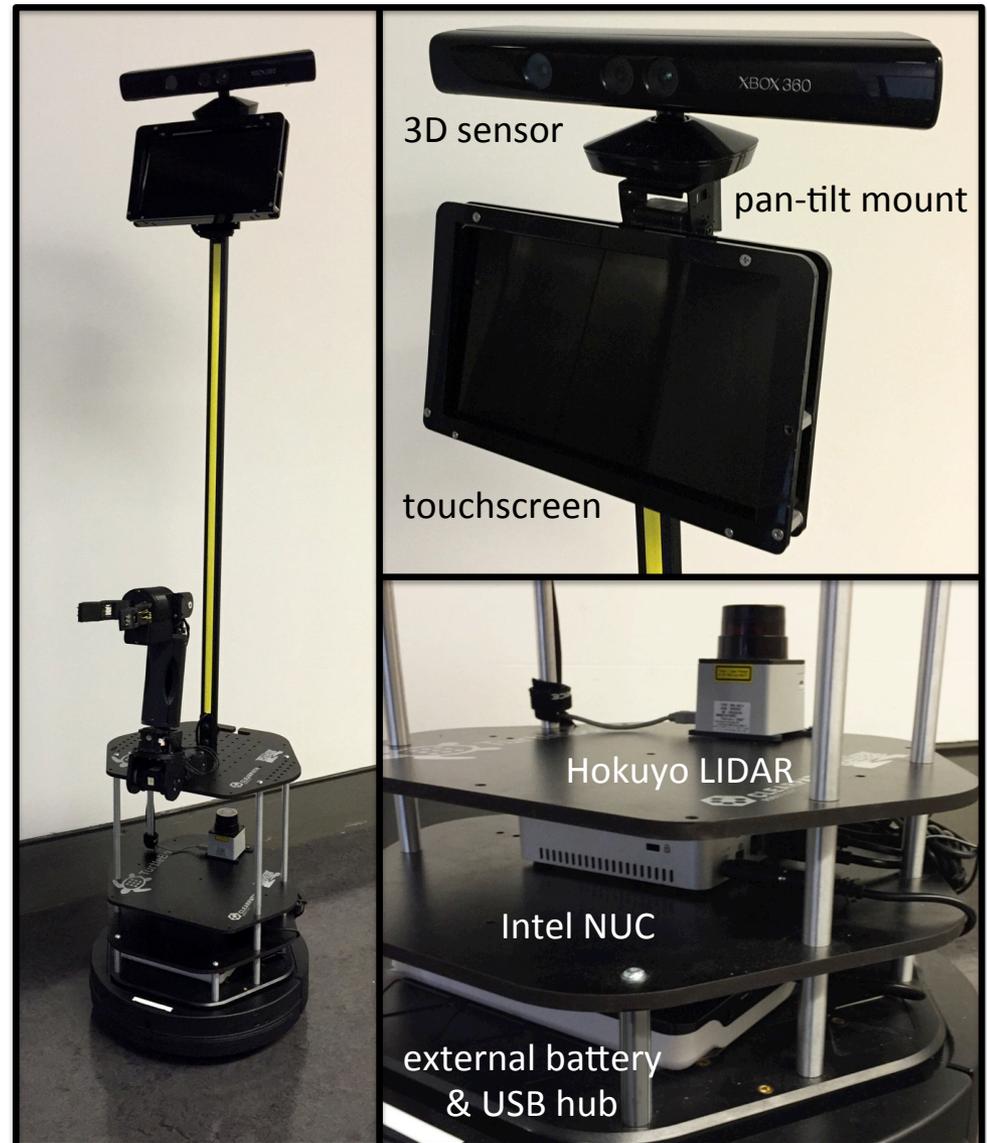
- Nexus 7 (or other) tablet
- Interaction/telepresence

Improved perception

- Hokuyo LIDAR
- Top-mounted 3D camera

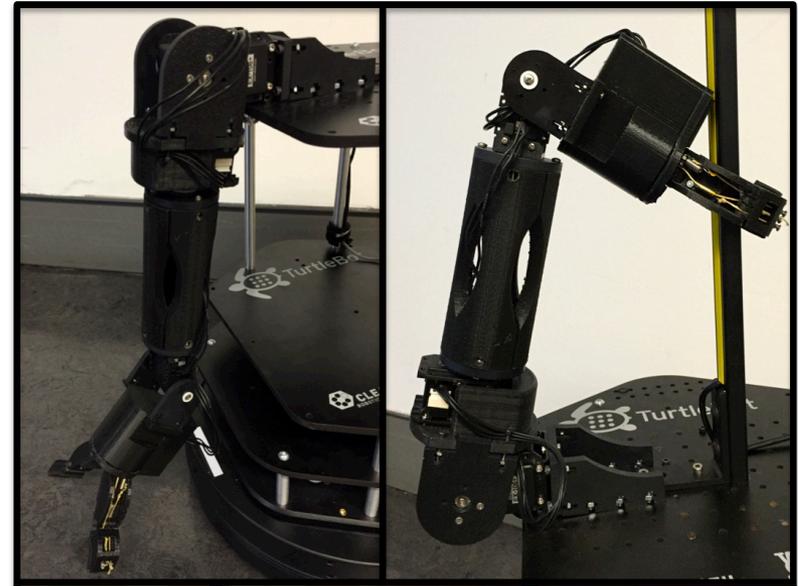
Low-cost modular arm

- 3D-printed / laser-cut



Modular Low-Cost Robot Arm

- 3D-printed PLA, laser-cut PLA
- Dynamixel servos
- Easy to assemble
- Modular gripper
 - Parallel jaw gripper
 - Compliant gripper
- Arduino controller / ROS



	 PhantomX Reactor	 DesiArm	 WidowX Mark II	 [Quigley et al.]	 Dr. Robot Jaguar	 Cyton Gamma 1500	 Universal Robots UR3	 KUKA Youbot
Estimated Cost	\$550	\$850	\$1,500	\$4,135	\$8,750	\$12,000	\$23,000	\$24,200
Degrees of Freedom	6	4	6	7	4	7	6	5
Total weight (Kg)	1.36	0.75	1.33	11.4	10	2	11	7.4
Max Payload (Kg)	0.6	1.4	0.8	2	4	1.5	3	0.5

<http://www.seas.upenn.edu/~eeaton/projects/servicerobot/>