Sean J. Wang

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RESEARCH INTERESTS

My research focuses on making robots more capable in real world environments. I am particularly interested in making reinforcement learning algorithms suitable for physical systems by improving robustness, adaptability and sample efficiency.

EDUCATION

Carnegie Mellon University Anticipated Graduation: Dec. 2022
PhD, Mechanical Engineering
GPA: 4.0

University of California, Santa Barbara June 2018
BS/MS, Mechanical Engineering
BS Major GPA: 3.97 | MS GPA: 4.0

PHD RESEARCH

Autonomous Wheeled Rough Terrain Traversal Jan. 2020 - Present
- Implemented model-based reinforcement learning in PyTorch to autonomously navigate a wheeled robot over rough terrain, simulated in Pybullet.
- Improving robustness, adaptability, and sample efficiency of real world data-driven controllers, by leveraging simulation data and accounting for prediction uncertainty.

Robotic Environmental Sampling May 2019 - Present
- Designed and built a robot to collect soil samples from remote locations.
- Integrating sensors and controls for in situ measurement of soil contaminants.
- Developing algorithms that plan sampling locations for optimal information gain.

Contact Localization for Transparent Robots May 2018 - May 2019
- Created a velocity-based method for transparent robots to localize contact.
- Implemented method on a legged Minitaur robot and in a MATLAB simulation.

ACADEMIC & RESEARCH PROJECTS

ISLA - CMU Jan. 2019 - May 2019
- Designed a bio-inspired quadrupedal robot that rolls for more efficient locomotion.
- Simulated and optimized rolling behavior in MATLAB.

Advanced Imaging Drone - UCSB August 2016 - May 2017
- Developed pilot awareness and safety systems that allow unmanned aerial systems to fly through forest canopies and locate endangered birds.

Multi-Agent Surveillance Path Planning - UCSB Jan. 2016 - June 2016
- Created coverage control algorithms for networks of surveillance robots operating under sparse communication constraints.
- Simulated algorithms in MATLAB to evaluate performance.

Remote Bike Lock Design - UCSB Mar. 2016 - June 2016
- Created a prototype remote controlled bike lock with locating features.

RoboRat Design - UCSB Mar. 2015 - June 2015
- Built a robot capable of autonomously navigating a course to collect blocks.

INDUSTRY EXPERIENCE

Strand Products, Inc. Santa Barbara, CA May 2017 - Aug. 2017
Mechanical Engineer Intern
- Designed machines to automate manufacturing processes of cable assemblies.

Continental AG. Santa Barbara, CA May 2016 - Dec. 2016
Mechanical Engineer Intern
- Designed components for a long range LIDAR sensor prototype.

TEACHING EXPERIENCE

Carnegie Mellon University
24-352 (Dynamics, Systems & Controls) TA Jan. 2020 - Dec. 2020

University of California, Santa Barbara
ME 10 (Graphic, CAD & Design) TA Mar. 2018 - June 2018
ME 156A/B (Mech. Eng. Design I/II) TA Sep. 2017 - Mar. 2018
ME 155A (Control System Design) Reader Mar. 2017 - June 2017
ME 179P/L (Robotics: Planning/Design) Reader Mar. 2016 - June 2016

PUBLICATIONS

1. **Sean J. Wang**, Samuel Triest, Wenshan Wang, Sebastian Scherer, and Aaron M. Johnson. Rough terrain navigation using divergence constrained model based reinforcement learning. In *Conference on Robot Learning*. PMLR, 2021. To appear
2. **Sean J. Wang** and Aaron M Johnson. Domain adaptation using system invariant dynamics models. In *Learning for Dynamics and Control*, pages 1130–1141. PMLR, 2021
3. **Sean Wang**, Valeria Nava, Nicholas Jones, Gregory Lowry, and Aaron M. Johnson. Ground-based robots for soil collection and analysis. In *American Geophysical Union (AGU) Fall Meeting*, December 2020
4. **Sean J. Wang**, Ankit Bhatia, Matthew T. Mason, and Aaron M. Johnson. Contact localization using velocity constraints. In *Proceedings of the IEEE/RSJ Intl. Conference on Intelligent Robots and Systems*, Las Vegas, NV, Oct. 2020
5. Letong Wang, **Sean Wang**, and Aaron M. Johnson. Traversability analysis for highly maneuverable wheeled robots. Technical report, CMU Robotics Institute Summer Scholars Working Papers Journal, 2019
6. Jeffrey R. Peters, **Sean J. Wang**, and Francesco Bullo. Coverage control with anytime updates for persistent surveillance missions. In *2017 American Control Conference (ACC)*, pages 265–270. IEEE, 2017
7. Jeffrey R. Peters, **Sean J. Wang**, Amit Surana, and Francesco Bullo. Cloud-supported coverage control for persistent surveillance missions. *Journal of Dynamic Systems, Measurement, and Control*, 139(8), 2017

SKILLS

Software & Programming: C++, Python, PyTorch, PyBullet, ROS, MATLAB
Algorithms: Deep Reinforcement Learning, Path Planning, State Estimation/Filtering
Prototyping: CAD (SolidWorks & CATIA), Basic Fabrication, Basic Circuitry

HONORS & AWARDS

TCS Presidential Fellowship Aug. 2018 - July 2019
Tirrell Award for Distinction in Undergraduate Research May 2017
UCSB Junior Design Fair - Most Marketable Product May 2016
1st Place, UCSB Robotics: Design RoboRat Competition May 2015