Sean J. Wang

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SKILLS

Programming:	Python (PyTorch, Numpy), C++, JavaScript, MATLAB
Robotics/Simulation Tools:	ROS, Gazebo, PyBullet, OpenCV
Software & OS:	Linux/Ubuntu, Docker, Google Cloud Platform
Expertise:	Deep Learning, Path Planning, Control Systems, State Estimation

EDUCATION

Carnegie Mellon University (CMU) Anticipated Defense: Dec. 2023
PhD, Mechanical Engineering
GPA: 4.0

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

PHD THESIS

Data-Driven Autonomous Outdoor Rock Crawling Jan. 2020 - Present

- Developed reinforcement learning algorithms to safely drive wheeled robots over rough, obstacle-ridden terrain.
- Trained neural networks for vehicle trajectory prediction using LiDAR-generated maps.
- Integrated stochastic predictions into a planning/control framework, allowing for safe navigation.
- Formulated sim2real algorithms to transferring knowledge learned from PyBullet simulations to the real-world.

RESEARCH & ACADEMIC PROJECTS

Robotic Environmental Sampling - CMU May 2019 - Present

- Built and programmed a robot for soil contamination sensing in remote locations.
- Implemented algorithms for planning optimal measurement locations and navigation.

Contact Localization for Transparent Robots - CMU May 2018 - May 2019

- Formulated a velocity-based method for transparent robots to localize contact.
- Evaluated method on a legged Minitaur robot and in simulation.

ISLA - CMU Jan. 2019 - May 2019

- Designed a bio-inspired quadrupedal robot that rolls for more efficient locomotion.
- Simulated and optimized rolling behavior.

Advanced Imaging Drone - UCSB Aug. 2016 - May 2017

- Engineered pilot awareness and safety systems for locating endangered birds in forest canopies.

Multi-Agent Surveillance Path Planning - UCSB Jan. 2016 - June 2016

- Created complete coverage algorithms for surveillance robot networks operating under sparse communication.

INDUSTRY EXPERIENCE

Piximo Robotics, LLC - Pittsburgh, PA Jan. 2022 - September 2023
Co-Founder

- Developed robots that enable remote workers to interact with and deliver care items to elderly in retirement homes.
- Interviewed potential customers to identify product market fit and to inform technology development directions.
- Secured grants and paid pilots to fund prototype development.

Strand Products, Inc - Santa Barbara, CA May 2017 - Aug. 2017
Mechanical Engineer Intern

- Invented machines to automate existing manufacturing processes of cable assemblies.

Continental AG - Santa Barbara, CA May 2016 - Dec. 2016
Mechanical Engineer Intern

- Modeled and fabricated components for a long range LIDAR sensor prototype.

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

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
ME 179L (Robotics: Design) Reader Mar. 2016 - June 2016

SELECTED PUBLICATIONS

Sean J. Wang, Honghao Zhu, and Aaron M. Johnson. Pay attention to how you drive: Safe and adaptive model-based reinforcement learning for off-road driving. In *arXiv:2310.08674 [cs.RO]*, 2023. Under review

Samuel Triest, Matthew Sivaprakasam, **Sean J. Wang**, Wenshan Wang, Aaron M. Johnson, and Sebastian Scherer. TartanDrive: A large-scale dataset for learning off-road dynamics models. In *IEEE Intl. Conference on Robotics and Automation*, pages 2546–2552, Philadelphia, PA, May 2022

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*, volume 164 of *Proceedings of Machine Learning Research*, pages 224–233, November 2021

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

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

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

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