Hersh Sanghvi

hsanghvi@seas.upenn.edu | hersh500.github.io

Education

Ph.D (in progress, est.grad 2025): University of Pennsylvania, PhD, Department of Computer and Information Science

Undergraduate: University of California, Berkeley (grad. May 2019), BS in Electrical Engineering and Computer Science, Honors in Neurobiology (GPA: 3.76)

Research Experience

Graduate Student Researcher at University of Pennsylvania (Fall 2019 – Present):

- My research centers on learning to adapt planning and control strategies in new environments based on information gathered online during robot operation (e.g. vision, joint encoders, etc.). Current and past projects include training models using meta-learning for fast controller adaptation to new robots and environments, footstep planning for legged robots using supervised learning, and using model-free reinforcement learning for legged robot navigation. I am advised by Dr. Camillo Jose Taylor in the GRASP Lab.

Controls Research at UC Berkeley (Fall 2017 - Spring 2019):

- I worked in the Biomimetic Millisystems Lab to implement control schemes on novel jumping robot, Salto. This consisted of hardware improvements to the electronics along with implementing an inertial quaternion-based sliding mode observer in firmware for onboard attitude estimation during jumping.

Computational Neuroscience Research at UC San Francisco (Spring 2016 – Summer 2017)

- I worked on accelerating simulation of neuronal circuits using a GPU to solve Markov models for the NeuroGPU project. This work was presented at SfN in 2016 and published in 2022.

Publications and Technical Writing

- **H.Sanghvi,** S.Folk, C.J. Taylor, "OCCAM: Online Continuous Controller Adaptation with Meta-Learned Models" (Currently under double blind peer review). Feb 2024. Google Drive Link
- **H. Sanghvi**. "Recent Approaches to Perceptive Locomotion". June 2022. ArXiv Link
- **H. Sanghvi** and C.J. Taylor. "Fast Footstep Planning on Uneven Terrain Using Deep Sequential Models", in *International Conference on Robotics and Automation*, May 2022. Arxiv Link
- R. Ben-Shalom, A. Ladd, N. S. Athreya, C. Cross, K.G Kim, **H. Sanghvi**, A. Korngreen, K. E. Bouchard, K. J. Bender. "NeuroGPU: Accelerating multi-compartment, biophysically detailed neuron simulations on GPU". *Journal of Neuroscience Methods*, Volume 366, 2022, https://doi.org/10.1016/j.jneumeth.2021.109400.
- W. Gosrich, J. Parker, **H. Sanghvi,** T. Srivastava, S. Wolfman. "Neutralizing the Algorithm: Approaches for Reducing the Spread of Disinformation Online", in *SciTech Forefront,* July 2022. Online Link
- V. Gupta, J. Hypolite, S. Mell, **H. Sanghvi**, "Securing Election Infrastructure with Hand-Marked Paper Ballots". *Journal of Science Policy & Governance.* September 30, 2020. https://doi.org/10.38126/JSPG170106

Industry Experience

Robotics Software Intern at Neuralink (Summer 2018, Summer 2019):

- I developed an automated testbench for a surgical robot that mimics natural brain motion by through visual analysis algorithms of video data. I also developed algorithms based on computer vision for guidance of the surgical robot.

ASIC Bringup Intern at NVidia (Summer 2017):

- Analysis and characterization of high speed interconnect performance, latency, throughput (PCIe, NVLink) in various low power, error, and high-power states, and behavior with different systems. Worked with clocking, logic analyzer usage, link TL, DL, PL, and link training and initialization protocols

Skills

- Languages: Python, C++, C, Java
- Libraries and Frameworks: NumPy/Scipy, PyTorch, BoTorch, Drake, PyBullet, ROS, Isaac Gym
- Robotics, Supervised Learning, Reinforcement Learning, Controls, State Estimation, Computer Vision, Bayesian Optimization

Relevant Coursework

University of Pennsylvania

Learning for Dynamics and Control, Data-Driven Robotic Perception and Control, Vision and Language, Introduction to Optimization, Analysis of Algorithms, Machine Learning

UC Berkeley

Computational Photography, Model Predictive Control, 3D Reconstruction and Recognition, Nonlinear System Theory, Digital Signal Processing, Stochastic Processes, Linear System Theory, ASIC Digital Design, Feedback Controls, Efficient Algorithms, Adv. Linear Algebra, Signals and Systems, Microelectronic Devices and Circuits, Molecular Neurobiology, Neurobiological Diseases

Teaching

Teaching Assistant for CIS 581 @ UPenn: Computer Vision & Computational Photography (Fall 2020)

- Held office hours to guide students through programming assignments, developed discussion sections to reinforce lecture concepts, answered student questions online, and helped to write exam questions