Ajay Sridhar

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EDUCATION

Ph.D. Candidate in Computer Science, Stanford University   **Start: Fall 2024**
Robotics and Machine Learning

B.S. in Electrical Engineering and Computer Science, Minor in Logic UC Berkeley   **August 2020 — May 2024**
GPA: 3.986/4.00 (High Honors)
Courses: Machine Learning; Artificial Intelligence; Deep Reinforcement Learning; Optimization Models; Probablity; Algorithms; Discrete Math Linear Algebra; Math Logic; Circuits; Signal Processing; Robotics; Computability and Complexity

RESEARCH EXPERIENCE

Machine Learning and Robotics Research, Prof. Sergey Levine   **February 2022 — May 2024**
University of California, Berkeley   *Berkeley, CA*

- Researching how general goal-conditioned models for vision-based navigation and exploration can be trained on data obtained from many distinct robots to enable broad generalization across environments and embodiments.
- Main contributor to **a public GitHub repository** with over 200 stars containing code and pre-trained models to support future research in the field of autonomous robotic navigation and learning.

Machine Learning Research, Prof. Thomas G. Dietterich & Dr. Kiri Wagstaff   **May 2021 — February 2022**
Oregon State University   *Corvallis, OR*

- Applied temperature scaling to Domain Adversarial Neural Networks (DANNs) on a novel image recognition task related to domain generalization and calibration.
- Achieved promising results on the novel classification task using the Office-Home benchmark dataset, and presented findings at the EECS Undergraduate Research Program at OSU.

AWARDS & HONORS

2024	ICRA Best Conference Paper
2024	ICRA Best Student Paper Finalist
2024	ICRA Best Cognitive Robotics Paper Finalist
2024	NSF Graduate Research Fellowship
2024	Outstanding Graduate Student Instructor Award
2024	CRA Outstanding Undergraduate Researcher Award Finalist
2023	Cal Alumni Leadership Scholarship
2023	EECS Honors Program
2023	EECS Evergreen Undergraduate Research Award
2021	Tau Beta Pi (TBP) - Engineering Honors Society
2020	Cal Alumni Leadership Scholarship
2019	Congressional App Challenge Winner

RESEARCH PAPERS

1. **GNM: A General Navigation Model to Drive Any Robot**

   Dhruv Shah*, **Ajay Sridhar***, *Arjun Bhorkar, Noriaki Hirose, Sergey Levine* (***Equal contribution**)

   - *Description:* GNM is vision-based navigation policy trained with a simple goal-reaching objective on a cross-embodiment navigation dataset. It exhibits positive transfer, outperforming specialist models trained on singular embodiment datasets, and generalizes to new robots.
   - *Publication:* International Conference on Robotics and Automation (ICRA) 2023

2. **ViNT: A Foundation Model for Visual Navigation**

   Dhruv Shah*, **Ajay Sridhar***, *Nitish Dashora*, Kyle Stachowicz, Kevin Black, Noriaki Hirose, Sergey Levine* (***Equal contribution**)

   - *Description:* ViNT is a flexible Transformer-based model for visual navigation that can be efficiently adapted to a variety of downstream navigational tasks.
   - *Publication:* Conference on Robot Learning (CoRL) 2023 **(Oral Presentation & Live Demo, 6.6%)**
   - *Symposium:* BayLearn Machine Learning Symposium 2023 **(Oral Presentation, <8%)**

3. **NoMaD: Goal Masking Diffusion Policies for Navigation and Exploration**

   Ajay Sridhar, *Dhruv Shah, Catherine Glossop, Sergey Levine*

   - *Description:* NoMaD is a novel architecture for robotic navigation in previously unseen environments that uses a unified diffusion policy to jointly represent exploratory task-agnostic behavior and goal-directed task-specific behavior.
   - *Publication:* International Conference on Robotics and Automation (ICRA) 2024 **(Best Conference Paper, 0.05%)**
   - *Workshop:* NeurIPS 2023 Worshop on Foundation Models for Decision Making **(Oral Presentation, <6%)**

4. **ExAug: Robot-Conditioned Navigation Policies via Geometric Experience Augmentation**

   Noriaki Hirose, Dhruv Shah, **Ajay Sridhar**, *Sergey Levine*

   - *Description:* ExAug is a vision-based navigation policy that learns to control robots with varying camera types, camera placements, robot sizes, and velocity constraints by applying a novel geometric-aware objective to view augmented data.
   - *Publication:* International Conference on Robotics and Automation (ICRA) 2023

5. **SACSoN: Scalable Autonomous Data Collection for Social Navigation**

   Noriaki Hirose, Dhruv Shah, **Ajay Sridhar**, *Sergey Levine*

   - *Description:* SACSoN is vision-based navigation policy that learns socially unobtrusive behavior in human-occupied spaces through continual learning.
   - *Publication:* IEEE Robotics and Automation Letters (RA-L) 2023
   - *Workshop:* IROS 2023 Workshop on Social Robot Navigation **(Spotlight Presentation)**

6. **SELFI: Autonomous Self-improvement with Reinforcement Learning for Social Navigation**

   Noriaki Hirose, Dhruv Shah, Kyle Stachowicz, **Ajay Sridhar**, *Sergey Levine*

   - *Description:* SELFI is an online reinforcement learning approach for fine-tuning control policies trained with model-based learning. We combine the objective used during model-based learning with a Q-value function learned online.
   - *In Submission:* 2024 Conference on Robot Learning

TEACHING EXPERIENCE

Teaching Assistant for Introduction to Artificial Intelligence (CS 188), Prof. Stuart Russell   January 2022 — May 2024
University of California, Berkeley   *Berkeley, CA*

- Teaching fundamental concepts in AI such as search, game playing, knowledge representation, inference, planning, reasoning under uncertainty, machine learning, and perception.
- Responsible for holding weekly discussion sections, writing exam questions, grading homework assignments, and holding project office hours.

Laboratory Tutor for Designing Information Devices and Systems II (EECS 16B)   September 2021 — December 2021
University of California, Berkeley   *Berkeley, CA*

- Taught students fundamental concepts in machine learning, circuit design, control, and signal processing through different labs: 4-bit ADC, band-pass filters, and a voice-controlled robot car.
- Ensured all 40-50 students in each lab section received help with debugging physical circuits and Python code.