Karkala Shashank Hegde

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Programming Skills

Python (Tensorflow, PyBullet, Mujoco, Gym, PyTorch, Pandas, Numpy, Flask, Scikit-learn, Scipy, ROSpy), **MATLAB** (Statistics and ML, Deep Learning, Signal Processing Toolboxes), **C++** (OpenAL, OpenCV)

Education

- **University of Southern California - PhD** — Los Angeles, USA
  Electrical and Computer Engineering — *GPA: 3.94/4* — *2021 – Present*
  AI Researcher at the Robotic Embedded Systems Laboratory, advised by Dr. Gaurav Sukhatme.
  Teaching Assistant: EE541 - A Computational Introduction to Deep Learning; EE641 - Deep Learning Systems; CSCI567 - Machine Learning.
- **University of Southern California - Master of Science** — Los Angeles, USA
  Electrical and Computer Engineering — *GPA: 3.94/4* — *2019 – 2021*
- **National Institute of Technology Karnataka - Bachelor of Technology** — Surathkal, India
  Electrical and Electronics Engineering — *GPA: 8.17/10* — *Thesis GPA: 9.5/10* — *2013 – 2017*

Industry Experience

- **Applied Research Scientist Intern** — Seattle, USA
  NVIDIA — *May 2025 – Aug 2025*
  - Trained a large-scale LLAMA transformer for self-driving vehicles using world model based imitation learning, reducing front collisions and improving policy safety.
  - Developed generative models to produce BEV visualizations, revealing latent policy representations.
- **Deep Learning Scientist Intern** — Seattle, USA
  NVIDIA — *May 2024 - Dec 2024*
  - Trained a video diffusion model to generate RGB frames and BEVs for self-driving vehicle scenarios.
  - Utilized automatic mixed precision to bring down project costs by 30%.
- **Data Scientist** — Bangalore, India
  Fidelity Investments: Asset Management Technology — *July 2017 - July 2019*
  - Built a simulator using real trading data and trained an RL agent for portfolio construction in equity trading.
  - Worked with the Equity Trading team to develop backend services with Java spring-boot, Python Flask, SQL, and Splunk.

Academic Experience

- **Research assistant -PhD** — Los Angeles, USA
  Robotic Embedded Systems Laboratory[link], *USC* — *Sept 2020 - present*
  - Training intelligent visual controllers for Manipulation: I built a data collection pipeline for the Franka Emika Panda robot using ROS, libfranka and a 6D spacemouse; trained and deployed a diffusion policy based vision controller.
  - Used CLIP language encoder with Latent Diffusion Models and Graph Hypernetworks for generative modeling in behavior space for language-conditioned robotic control on SLURM.
  - Create high-performing small Neural Networks on AWS EC2 instances for quadrotor flight control.
  - Experiment with audio-based communication between agents with multi-agent reinforcement learning for video game AI

Select Publications

- **Hegde, S.**, Das, S., Salhotra, G., & Sukhatme, G. S. Latent Weight Diffusion: Generating reactive policies instead of trajectories. preprint arXiv:2410.14040 (RSS 2025 RCR Workshop, NeurIPS 2025 Embodied World Models for Decision Making Workshop)
- Popov, A., Degirmenci, A., Wehr, D., **Hegde, S.**, ... Mitigating Covariate Shift in Imitation Learning for Autonomous Vehicles Using Latent Space Generative World Models. arXiv preprint arXiv:2409.16663. (ICRA 2025: Robots in the wild workshop)
- **Hegde, S.**, Huang, Z., and Sukhatme, G.S., 2023. HyperPPO: A scalable method for finding small policies for robotic control. arXiv preprint arXiv:2309.16663.(ICRA 2024)[site]
- **Hegde, S.**, Batra, S., Zentner, K.R. and Sukhatme, G.S., 2023. Generating Behaviorally Diverse Policies with Latent Diffusion Models. arXiv preprint arXiv:2305.18738. (NeurIPS 2023)[site]
- **Hegde, S.** and Sukhatme, G.S., 2023, May. Efficiently Learning Small Policies for Locomotion and Manipulation. In 2023 IEEE International Conference on Robotics and Automation (ICRA 2023) (pp. 5909-5915). IEEE.[site]
- **S. Hegde**, Kanervisto, A., & Petrenko, A. (2021, August). Agents that listen: High-throughput reinforcement learning with multiple sensory systems. In 2021 IEEE Conference on Games (CoG) (pp. 1-5). IEEE. [site]

Achievements

- **USC Annenberg Fellow**: Awarded for my PhD; **Masters Student Honors Program**[link]: For outstanding academic and research achievements during my Masters
- **Soda bottle classification contest**[link]**:** Winner of image classification contest hosted by Deep Cognition.
- **High School:** Best Outgoing student in school, ranked in top 1% of All India Engineering exam.