Darshan Hegde

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Experienced roboticist with a track record of applying machine learning to complex production robotics challenges, including 3D detection, tracking, trajectory forecasting (self-driving), grasp planning, sensorimotor policy learning and RL fine-tuning. My current research interests are on post-training large behavior models to enhance reliability and performance suitable for real-world production environments.

EDUCATION

Stanford University, Stanford, CA — Jan 2023 – March 2025
Part-time MS in CS [Dropped Out]

Relevant Coursework: Introduction to Robotics (CS223A), Advanced Robotic Manipulation (CS 327A), Deep Reinforcement Learning (CS 224R), Independent Research on Dexterous Manipulation (Advisor: Prof. Oussama Khatib), Optimal and Learning based Control (AA 203), Sensorimotor Learning for Embodied Agents (CS381).

New York University, New York, NY — Sept 2013 – May 2015
Masters of Science in Data Science

Relevant Coursework: Deep Learning, Statistical NLP, Inference & Representation (Probabilistic Graphical Models), Numerical Optimization, GPU Computing, MCMC Methods.

R V College of Engineering, Bangalore, India — Aug 2007 – Jun 2011
Bachelor of Engineering in Electronics and Communications

PROFESSIONAL EXPERIENCE

Outrun Robotics Inc, Fremont, CA — Jan 2025 – present
Co-founder & CTO

- Architected & developed the perception, compute, and vision monitoring systems for our remote autonomy stack. Deployed two robotic systems to a factory production environment in under six months with $500k in funding. Scaled the platform to two additional production facilities, achieving pre-production (pilot) performance within one week. (Video)
- Developed HIL-RL based post-training pipeline to make large behavior models performant and reliable (Video)
- Marketing & sales efforts to find SMB customers in need of automating stationary repetitive tasks such as pick & place, case packing and inspection / sortation generating about 2-5 new customer meetings per week.

TECHNICAL SKILLS: SAM3, RF-DETR, Foundation Pose, Gaussian Splats (GPS-SLAM), Open3D, CuRobo, LeRobot.

Tacta Systems Inc, Palo Alto, CA — Dec 2023 – Jan 2025
Staff Roboticist

- Engineered sensorimotor policies for dexterous multi-fingered manipulation using tactile sensors. Designed and maintained end-to-end robotics software, creating key demonstrations for Series-A funding that showcased advanced multi-fingered dexterity.

TECHNICAL SKILLS: Sensorimotor Policy Learning, Reinforcement Learning, Tactile Sensor Fusion, Operational space controller for manipulators.

Dexterity Inc, Redwood City, CA — Jun 2021 – Dec 2023
Senior Robotics Software Engineer

- Designed, developed, and deployed a grasp prediction model that optimizes both object selection and grasp pose from overhead RGBD camera data.
- Developed and deployed an IoU-based tracker to increase picking speed and improve handling of dynamic scenes.
- These components significantly enhanced the speed and reliability of the parcel sortation product, enabling a throughput of 2000 PPH with minimal intervention. At the peak of deployment, it was running on 75+ robots sorting millions of parcels on a weekly basis. (Video)
- Created and maintained a regression testing framework for perception pipelines, proactively identifying performance regressions across all product lines.
- Developed a research prototype for tight-box packing using a residual RL policy with F/T sensor and state inputs.

TECHNICAL SKILLS: Dex-robotics stack, C++, Pytorch, Robosuite, Open3D.

Aurora Innovation, San Francisco, CA — Jan 2021 – Jun 2021

Senior Software Engineer

- Continued Uber ATG projects post-acquisition, focusing on trajectory forecasting using graph neural networks.

Uber ATG (Advanced Technologies Group), San Francisco, CA — Jan 2017 – Jan 2021

Senior Autonomy Engineer (Deep Learning for Perception & Prediction)

- Developed an efficient 2D multi-class detection (RFCN) network using camera image data with state-of-the-art detection metrics. Improved the metrics further by using hard example mining.
- Developed a novel and highly efficient sensor fusion (image + lidar) 3D detection model with state-of-the-art results, which is one of the present production models for 3D object detection. This work resulted in a patent and was also published in the CVPR Workshop 2019. The model was running on 50+ self-driving cars performing the bulk of perception.
- Extended the similar sensor fusion approach for joint perception and prediction (MultiXNet). This is one of the production models for joint perception (3D detection) and prediction (short-term trajectory prediction). This work was submitted to ICRA 2021.
- Mentored 2 interns, with one internship leading to a publication in NeurIPS 2019 and the other intern receiving a return offer.

TECHNICAL SKILLS: PyTorch, Tensorflow, TensorRT, C++, Proprietary Robotics framework (rNA & AXL).

NVIDIA, Santa Clara, CA — Jun 2015 – Jan 2017

Machine Learning Engineer

- Contributed towards #1 KITTI object detection submission at the time (March 2016) based on DetectNet.
- Built the image segmentation demo which was showcased by NVIDIA during CES 2016.
- Worked on end-to-end driving in simulation (using TORCS) using deep reinforcement learning (A3C). The trained policy exhibited interesting behaviours for nudging other cars for overtaking / efficient turns and recovering from deviations from the road.

TECHNICAL SKILLS: Caffe, Tensorflow, OpenAI Gym, TORCS.

ACADEMIC PROJECTS

Operational Space Controller (Position & Force) for Allegro Hand Teleoperation.

Advisors: Wesley Guo, Prof. Oussama Khatib

- Developed operational space controller for fingertip position and force control for allegro hand. Use human hands to teleoperate the allegro hand.

PUBLICATIONS

1. Multi-View Fusion of Sensor Data for Improved Perception and Prediction in Autonomous Driving (WACV 2022)
2. Improving Movement Prediction of Traffic Actors using Off-road Loss and Bias Mitigation Workshop on 'Machine Learning for Autonomous Driving' at Conference on Neural Information Processing Systems (ML4AD @ NeurIPS 2019)
3. Sensor Fusion for Joint 3D Object Detection and Semantic Segmentation Workshop on Autonomous Driving CVPR 2019.
4. Convolution Neural Networks for representing sentences/documents Master's Project, NYU 2015.
5. Temporal Analysis of Language through Neural Language Models ACL 2014.

AWARDS AND ACHIEVEMENTS

- Consumer Technology Scholarship by Consumer Reports from Fall 2013 to Spring 2015.
- Limca Book of Records – National Record 2011, for building & launching India's smallest satellite as part of Team STUDSAT.

TECHNICAL SKILLS

Primary Programming Languages	Python, C++.

Hands on experience with following technologies:

Robotics frameworks	ROS2, LeRobot, SAI (Stanford Robotics Stack), Drake, NVIDIA Isaac Sim / Lab
Computer vision frameworks	OpenCV, Open3D
Deep Learning Frameworks	PyTorch, TensorFlow
Accelerated computing frameworks	CUDA C++, TensorRT, ONNX
Developer Tools	Git / Github, Bazel, Cmake, Docker, Kubernetes.