Chetan Reddy Narayanaswamy

🌐 chetanreddyn.github.io 📞 +1 (650) 248 3078 📍 Stanford, CA ✉ chetanrn@stanford.edu in chetan-reddy-n

Education

Stanford University, CA   *Sept 2024 - Jun 2026*
MS in Robotics (MechE Dept) | GPA: 4.0/4.0
Courses: Convex Optimisation | Principles of Robot Autonomy | Decision Making under Uncertainty | Collaborative Robotics

Indian Institute of Technology Madras, India   *Aug 2019 - Jun 2024*
Masters (M.Tech) in Machine Learning, Bachelors (B.Tech) in MechE | CGPA: 9.48/10
Courses: Reinforcement Learning | Modern Computer Vision | Big Data Lab | Machine Learning | Data Structures and Algorithms

KTH Royal Institute of Technology, Sweden   *Aug 2022 - Jan 2023*
Semester Exchange (Robotics) | School of Computer Science | GPA: 5.0/5.0
Courses: Safe Robot Planning and Control | Advanced Deep Learning | Introduction to Robotics | Sustainable Development

Research and Professional Experience

CHARM and IPRL Lab, Stanford University | Robot Learning Researcher   *Stanford, CA*
Advisors: Prof. Allison Okamura and Prof. Jeannette Bohg| Skills: Data Collection, Imitation Learning   *Jan 2025 - Present*
- Exploring transformer-based imitation learning for the autonomous control of the da Vinci surgical robotic arm.

ARMLab, Stanford University | Computer Vision Researcher [Link]   *Stanford, CA*
Advisor: Prof. Monroe Kennedy | Skills: ROS, OpenCV, Fusion360, Camera Calibration   *Sept 2024 - Dec 2024*
- Designed a multi-camera system on a prosthetic arm for a better spatial awareness in activities of daily living (ADL)
- Implementing object tracking across the fields of view in RViz by using pre-calibrated cameras and coordinate transforms

Centre for AI Research, IIT Madras | RL Researcher [Link]   *Chennai, India*
Human in the Loop, Safe Reinforcement Learning (RL) | Skills: Pytorch, Imitation Learning   *Aug 2023 - Jun 2024*
- Enhanced the DDPG algorithm in Pytorch to enable action masking in continuous space by utilizing a human-provided safe set
- Achieved about 96% safety under disturbance in Safety-Gymnasium benchmark environments in training and deployment

Adobe Research | Machine Learning Intern [Link] (*Patent filed at USPTO)   *Bengaluru, India*
Clustering Users based on Causal Relationships | Skills: Python, Causal AI, Bayesian Statistics, Tensorflow   *May 2023 - Aug 2023*
- Researched and implemented different algorithms for causal inference like PC, FGES, FCI and LINGAM
- Achieved robust market clustering by developing a novel iterative algorithm combining causal structure discovery with DL

Projects

Perception and Action Stack on Turtlebot Hardware [Link]   *Stanford, CA*
Principles of Robot Autonomy, Stanford | Skills: ROS2, Mapping, Object Detection, OOP   *Sept 2024 - Dec 2024*
- Implemented ROS2 nodes for A*, Motion Planning, Control, ICP pose estimation, frontier exploration, and object detection
- Developed an end-to-end navigation system for a TurtleBot, transitioning from Gazebo to a real-world environment

Safety Critical Navigation using RGB-D Images | Graduate Robotics Research Project [Link]   *Stockholm, Sweden*
Robotics, Learning and Perception Lab, KTH | Skills: Python, ROS, Optimal Control   *Jan 2023 - May 2023*
- Defined new notions of ellipsoidal safesets obtained from noisy RGBD images to construct control barrier functions (CBFs).
- Achieved reactive obstacle avoidance with safety guarantees in an unknown environment with a success rate of 98.5%

Vision-Based Controller for Quadrotor | All-India Industry Robotics Challenge [Link]   *Chennai, India*
IIT Madras Robotics Team| Skills: C++, OpenCV, ROS, PID Control, Object Tracking   *Dec 2022 - Feb 2023*
- Transformed the existing ROS-based communication framework in C++ into a Python API making it platform-independent.
- Designed a post-flight analytics dashboard using React and Plotly to assess and tune the parameters in the algorithm
- Implemented multi-axis PID controller for precise drone hovering and vision-guided motion with 0.05m accuracy

Deep Reinforcement Learning in Autonomous Cars [Link]   *Sapporo, Japan*
Hokkaido University Summer Project | Skills: Pytorch, DQN   *May 2022 - Jul 2022*
- Investigated the use of DQN variants to optimise traffic flow in scenarios like highway merge and intersection crossings
- The average congestion clearance time was reduced by 30% when using RL-based autonomous cars over rule-based agents

Skills

- Robotics: ROS/ROS2, Mapping, A*, RRT*, Sensor Fusion, Kalman Filter (EKF, UKF, EKF SLAM), Particle Filter, SLAM, GTSAM
- Perception: Convolutional Neural Networks (CNNs), 3D Reconstruction, PnP, SfM, Stereo Vision, Camera Calibration
- Control: Linear Dynamical Systems, LQR, MPC, Reinforcement Learning (MDP/POMDP), DQN, DDPG, PPO
- Programming: Python, C++, Julia, MATLAB, PyTorch, OpenCV, TensorFlow, Pandas, NumPy, Scikit-learn, Git, Linux