SHARACHCHANDRA BHAT

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EDUCATION

Master of Electrical and Computer Engineering, UT Austin — 2021 - 2023 (Expected)
Graduate Portfolio Program in Robotics
GPA: 3.87/4

Master of Automotive Engineering, IIT Madras — 2017 - 2018
Bachelor of Engineering Design, IIT Madras — 2013 - 2017
Minor in Environmental Engineering
GPA: 8.93/10 (Top 5 in Department)
Awarded the KVPY national research fellowship in 2013

SKILLS AND COURSEWORK

Coursework Data Mining, Statistical Machine Learning, Probabilistic Robotics, Reinforcement Learning, Formal Verification, Control Systems, Convex Optimization, Mechanics of Robot Manipulators
Skills C++, Python, PyTorch, C, MATLAB, Mathematica, Javascript, ROS, Git

PUBLICATIONS

- Sai Shankar Narasimhan*, **Sharachchandra Bhat***, and Sandeep P. Chinchali. "Safe Networked Robotics via Formal Verification." arXiv preprint arXiv:2302.09182 (2023).
- Manabu Nakanoya, Sai Shankar Narasimhan*, **Sharachchandra Bhat***, Alexandros Anemogiannis, Akul Datta, Sachin Katti, Sandeep Chinchali, and Marco Pavone. "Co-Design of Communication and Machine Inference for Cloud Robotics." Autonomous Robot (2023).

ACADEMIC RESEARCH

Imitation learning with transformer policy for robot manipulation. *Fall 2022*

- Evaluated transformer design choices like cross-modal attention, featurizer networks and input sequence size.

Mobile robot navigation. *Fall 2021*

- Implemented a **full autonomous stack** to run on an **F1/10th** car in a mapped environment.
- Global navigation via Jump Point Search A*, localization via **Particle Filters**, obstacle avoidance via Path Scoring, and local navigation via **Model Predictive Control**.

Real-time correlative scan matching using CNNs. *Fall 2021*

- Trained a neural network regression model to achieve faster **point-cloud registration** of 2-D Lidar scans.

PROFESSIONAL EXPERIENCE - 3 YEARS

Robotics Engineer — Jul 2018 - Jul 2021
Systemantics India Pvt Ltd — *Bengaluru, India*
C, C++, MATLAB, Mathematica, ROS, Git

- *Motion Planning.* Improved trajectory smoothness using a real-time closed-form jerk-limited **trajectory generation** algorithm. Developed a **path-blending** algorithm with quaternion spline interpolation that provides higher-order continuity for arbitrary curves in both rotation and translation space.
- *Robot Kinematics and Dynamics.* Developed an efficient control algorithm for a novel 6DOF **hybrid manipulator** by deriving a closed-form solution to the forward and inverse kinematics and dynamics problems. Designed a **robot singularity avoidance** algorithm to navigate safely through the workspace.
- *Motion Control.* Implemented low-level **robot axes controllers** with dynamic load and friction compensation. Achieved robust control performance via system identification and gain scheduling.