SHARACHCHANDRA BHAT

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OBJECTIVE

Robotics Engineer with 2+ years of experience seeking full-time roles in autonomous driving/ machine learning/ robotics.

EDUCATION

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

Master of Automotive Engineering, IIT Madras — 2017 - 2018
Bachelor of Engineering Design, IIT Madras — 2013 - 2017
Minor in Environmental Engineering

SKILLS AND COURSEWORK

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

PROFESSIONAL EXPERIENCE

Robotics Engineer — Jul 2018 - Jul 2021
Systemantics India Pvt Ltd — *Bengaluru, India*

- *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 Modeling.* 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.

Intern — May 2016 - Jul 2016
Airbus — *Bengaluru, India*

- Developed an interactive JavaScript tool (Crossfilter and D3.js) for big data analaysis of aircraft structural loads.

ACADEMIC RESEARCH

Real-time correlative scan matching using CNNs. Trained a neural network regression model to achieve fast point-cloud registration of rasterized 2-D lidar scans. Inference time was much lower compared to prior search-based methods while having comparable accuracy.

Mobile robot navigation. 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 control via an Optimal Controller.

Formally verifiable networked robotics Developed a shield that provides probabilistic safety guarantees for a remotely controlled robot in the presence of stochastic network delays. The shield monitors the network latency and overrides control commands if necessary to ensure safety specifications are satisfied by the robot.

Robust Task-Aware Representation Learning. Large image compression gains can be obtained by focusing on downstream task performance instead of reconstruction at the cost of interpretability. Showed that adversarial training of an encoder-decoder network gives similarly high compression while providing human-readable reconstruction.