Satrajit Chatterjee

MSE in Robotics · University of Pennsylvania
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Education

University of Pennsylvania *Philadelphia, Pennsylvania*

Master of Science in Engineering - Robotics *August 2023 - Present*

Grasp Lab, Advisor - Pratik Chaudhari

Technical Skills

Programming Languages

Python, C/C++, Java, Kotlin, Dart, JavaScript, SQL

Areas & Frameworks

- **Robotics, Machine Learning & Statistical Analysis** (ROS, PyTorch, Ray, RLLib, Gymnasium, Stable-Baselines, TensorFlow, Keras)
- **Web Development & DBMS** (Flask, Django, MongoDB, MySQL)
- **App Development** (Flutter, Android Studio, Google Firebase)
- **General** (Git, Docker, Unix)

Work Experience

AWS AI - DeepRacer *Santa Clara, California*

Software Development Engineer I *May. 2022 - July 2023*

- Developing E2E RL pipeline for training in-sim and inference on physical racetracks with custom algorithms and/or reward functions.
- Developed automated experimentation pipeline based on trajectory consistency for efficient physical track testing.
- Developed automated off-track detection and stopping of the DeepRacer car for improved pit-crew efficiency during physical races.

The AirLab, Robotics Institute - Carnegie Mellon University *Pittsburgh, Pennsylvania*

Research Associate II | Advisor - Sebastian Scherer *Jun. 2021 - Apr. 2022*

- Developed sampling-based informative path planner for long horizon search and tracking.
- Developed simulation environment to test and evaluate information gathering using above mentioned planner.
- Team lead for MBZIRC Maritime Grand Challenge in Abu Dhabi, representing the CMU team in collaboration with Lockheed Martin.

Cushion AI *San Francisco, California*

Machine Learning Engineer *May 2021 - Jun. 2021*

- Reimplemented batch jobs with more efficient code, & better resource provisioning on AWS cloud to reduce annual bills by 5%.
- Migrated bank institutions in database from MX Atrium to Plaid to achieve tighter integration of bank services & the Cushion platform.
- Implemented unit-testing for database migration scripts as well as for new code, increasing code coverage by 20.

NASA Jet Propulsion Laboratory – Group 347J *Remote*

Research Intern | Advisor - Shreyansh Daftry *Oct. 2020 - April 2021*

- Developed context-aware adaptive algorithm selection using deep learning for motion planning.
- Created new dataset of auto-generated obstacle maps that simulate Martian terrain.
- Reduced planning time by an average of 8% and path cost by an average of 14% over baseline.

Multicomp Lab, Language Technologies Institute - Carnegie Mellon University *Pittsburgh, Pennsylvania*

Research Intern | Advisors - Amir Zadeh, Louis-Philippe Morency *May 2019 - Aug. 2020*

- Designed and developed CNN algorithms using asymmetric correlations for Facial Action Unit Detection.
- Designed custom loss function using Jaccard coefficient correlations to train a novel neural network to improve Action Unit detection.
- Improved overall F1 classification score by an average of 11% across all AUs compared to baseline on BP4D dataset.

Publications

IROS'22 **TIGRIS: An Informed Sampling-based Algorithm for Informative Path Planning**, Published *The AirLab, CMU*

Projects

NeuralMusicSynth *Pittsburgh, Pennsylvania*

TensorFlow, Python *Sep. 2021 - Jan.2022*

- Worked on developing automated music generation using a Variational Auto Encoder as a hobby project.
- Generated 16 measure piano roll MIDIs from a dataset of 600K+ measures from 36K+ songs from web-scraped 8-bit video game music.
- Trained network to learn a sparse latent space representation of 120 features using reconstruction loss.