

Aryaman Patel

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EDUCATION

Northeastern University, Boston, MA

Expected 2024

Masters of Science: Robotics (ECE)

GPA: 3.84/4.0

Relevant Coursework: Mobile Robotics, Deep Learning, Computer Vision, Advance Perception, Robot Sensing and Navigation

Symbiosis Institute of Technology, Pune, India

2017 - 2021

Bachelor of Technology: Mechanical Engineering

GPA: 8.46/10.0

SKILLS

Programming

C++, Python, Matlab, Bash

Libraries and Software

Eigen, PyTorch, GTSAM, PCL (Point Cloud Library), OpenCV, ROS, Git, OpenGV

EXPERIENCE

Research Assistant

Feb 2023 - Present

NEURAL (NEU Robust Autonomy Lab)

Boston, MA

- Implemented a Bag of Words (DBow2) based Visual Place Recognition module, for long-term data association for re-localization and loop detection tasks for a multi-camera visual-inertial-GPS sensing and navigation system
- Optimized visual SLAM system by implementing reduced-camera system for solving Bundle Adjustment problem in a multi-camera setup utilizing smart projection factors that implemented elimination schemes to optimize over the poses
- Integrating a global re-localization and feature tracking module against 3D mapped points for localization under fast-paced conditions

Robotics Engineer

Jul 2021 - Feb 2022

iTrontik Smart Systems

Pune, India

- Developed sensor APIs using C++ for effective high-speed communicate with multiple sensor modules (cameras, optical sensors, etc.), ensuring scalable and maintainable software systems for AMR (Autonomous Mobile Robot)
- Created a rack entering and picking system, using move_base for cost-map based global path planning (A-star), along with depth perception in ROS, delivered a solution that ensures an accuracy of 2 cm
- Led a team of 6 in developing an optical sensor-based navigation robot. Implemented a precise navigation system that leverages data matrix and colored lanes for accurate 10cm localization on warehouse layouts

Electrical Engineering, Intern

Feb - Jun 2021

American Axle and Manufacturing

Pune, India

- Devised a 95% cost-effective remote axle health monitoring embedded device, with an on-board GPRS module, that predicts failures based on vibration analysis

PROJECTS

Video Panoptic Segmentation

[Present](#)

- Currently engineering DETR to incorporating temporal modeling for task of video panoptic segmentation in autonomous vehicle datasets

De-Blurring images

[GitHub](#)

- Implemented a model utilizing FCN (Fully Convolutional Networks) for predicting blur kernel, that can be used to de-blur images using Non-blind deconvolution, trained model estimates motion flow vector field upto MSE (Mean Squared Error) of 8.71

Shadow Image Decomposition

[GitHub](#)

- Implemented shadow modeling approach based on physical principles, utilizing a linear illumination transformation to represent shadow effects in images
- Employed two advanced deep networks, SP-Net and M-Net, to accurately predict shadow parameters and shadow mattes, thereby achieving superior image quality.

Computer Vision - Stereo Depth Map, Image mosaic, motion detection

[GitHub](#)

- Programmed computer vision algorithms from scratch in C++ and Python including stereo depth map estimation, image mosaicing, and motion detection between frames, showcasing understanding of Homography matrices and Epipolar geometry

Implementing Algorithms for Pointcloud Registration, Route Planning, and State Estimation.

[GitHub](#)

- Implemented A* Search and Probabilistic Roadmap algorithms for route planning in occupancy grid maps
- Implemented particle filtering for state estimation of a differential-drive ground robot on a Lie group