

# Anuj Shrivatsav Srikanth

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## EDUCATION

**Northeastern University, Boston, MA**

GPA: 4.0 / 4.0

*Candidate for Master of Science in Robotics, Concentration: Electrical and Computer Engineering*

*Courses: Mobile Robotics, Reinforcement Learning, Robot Sensing & Navigation, Computer Vision*

*September 2022 - June 2024*

**National Institute of Technology, Trichy, Trichy, India**

GPA: 8.9/10.0

*Bachelor of Technology in Electrical and Electronics Engineering*

*Courses: Modern Control Systems, Data Structures & Algorithms, Pattern Recognition, Linear Systems*

*August 2018 - May 2022*

## SKILLS

**Programming Languages:** C, C++, Python, MATLAB

**Software and Tools:** OpenCV, OpengGV, GTSAM, Eigen, Numpy, PyTorch, Tensorflow, PyBullet, BulletArm, ROS, Git

## WORK EXPERIENCE

**NEU Robust Autonomy Lab (NEURAL) - Multi-Camera GVIO SLAM**

*SLAM Researcher, in collaboration with Toyota Research Institute (TRI)*

*January 2024 - Present*

- Developed a non-linear optimization based **Multi-camera GPS-Visual-Inertial** system that tightly integrates GPS data, inertial measurements and visual input from a multi camera setup
- Implemented **smart projection factors** with elimination schemes for **pose graph optimization** using **GTSAM**
- Implemented **loop closure** module using **Bags of Binary Words for Fast Place Recognition in Image Sequences** (DBoW2)
- Implementing **Reinitialization** module to initialize the system once visual tracking is lost and to continue mapping
- Performed calibration for a set of **non-overlapping cameras** in Northeastern's autonomous car (NUance)
- Collected a dataset using **non-overlapping Point Grey FLIR cameras, VectorNav IMU, PPK GPS, and a fiber optic Gyro** for quantitative evaluation of SLAM system

**Institute for Experiential Robotics**

*Computer Vision Coop*

*June 2023 - December 2023*

- Developed an end-to-end architecture that performs real-time fish species classification and counting
- Integrated **background subtraction, semantic segmentation, and optical flow** using ensemble techniques for real-time background modeling of underwater videos and achieved a processing speed of **20fps**
- Implemented **Bayesian optimization** for hyperparameter search which improved test accuracy to 80%
- Developed a framework for fish species classification using **Vision Transformer** and **ResNet-50** models
- Interfaced a sensor suite consisting of an underwater **exploreHD camera** and an **Aquarian hydrophone** for fish monitoring

## RESEARCH EXPERIENCE

**Symmetric Models for Visual-Force Learning**

*Research Assistant, Helping Hands Lab, Northeastern University, Boston*

*Feb 2023 - June 2023*

- Contributed to implementation of **Equivariant encoder networks** and a **model-free**, highly sample-efficient **Equivariant Soft Actor-Critic** (SAC) policy network for diverse manipulation tasks involving image, tactile, and proprioceptive data
- Developed real-world experiments on a **UR5** robot and achieved **98%** test accuracy on real-world block picking task
- Implemented **Visuo-Tactile Transformer** (VTT) and **Product of Experts** (POE) networks as baselines

**Autonomous Reconnaissance Robot for Disaster Response**

*Northeastern University (Mobile Robotics)*

*October 2022 - December 2022*

- Developed a robust algorithm for **camera-based frontier exploration** by accurately detecting 13 out of 15 April Tags
- Developed an efficient algorithm for **extrinsic calibration** of sensor platform consisting of a **camera** and **2D Lidar**
- Implemented the complete **perception, planning** and **localization** pipeline on a **TurtleBot** robot

**Deep Learning for Multi-Object Tracking**

*Research Intern, Indian Institute of Space Science & Technology, Trivandrum, India*

*June 2021 - August 2021*

- Researched state-of-art DL algorithms for **multi-object tracking (MOT)** using the **tracking by detection** paradigm
- Implemented and tested the **DeepSORT** algorithm as a baseline for MOT research
- Developed a script to execute the **YOLO-v3** model for detecting pedestrians and trained a **Darknet-53** CNN model to extract features from each video frame
- Proposed a novel framework for tracking multiple pedestrians using an **LSTM** based prediction network and a **Siamese-CNN** for data association

## PUBLICATION

- Colin Kohler\*, **Anuj Shrivatsav Srikanth**, Eshan Arora, Robert Platt, "**Symmetric Models for Visual Force Policy Learning**", IEEE International Conference on Robotics and Automation (ICRA), Yokohama, Japan, May 2024
- Anuj Shrivatsav Srikanth**\*, Saicharan Thirandas, Dhanush Adithya Balamuguran, Anurag Daga, Dipanjan Saha, Taskin Padir, Robert Vincent, "**Real-Time Background-Agnostic Fish Localization in Underwater Videos towards Autonomous Species Monitoring**", IEEE OCEANS, Singapore, April 2024