

Apratim Mukherjee

WORCESTER MA, 01609

☎ (+1) (774) 262-6246 | ✉ amukherjee3@wpi.edu | 🏠 opletts.github.io | 📱 opletts | 📺 apratim-mukherjee

Education

Worcester Polytechnic Institute

Worcester, MA

MASTER'S IN ROBOTICS ENGINEERING, CURRENT GPA: 4.0/4.0

Aug. 2021 - May 2023

- Coursework: Foundations of Robotics, Robot Control, Robot Dynamics, Swarm Intelligence, Deep Learning, Reinforcement Learning.

Manipal Institute of Technology, Manipal

Karnataka, India

BACHELOR'S IN COMPUTER SCIENCE AND ENGINEERING (MINOR IN INTELLIGENT SYSTEMS)

July 2016 - Aug. 2020

- Coursework: AI, ML, NLP, CV, Optimization Techniques, Object Oriented Programming, Parallel Computing and Programming.

Skills

Programming & Tools C, C++, Python, Java, MATLAB, Pytorch, Tensorflow, ROS/ROS2, OpenCV, CUDA

Online Certifications [DL Specialization](#), [Math for ML](#), [Parallel Programming](#), [Bayesian Stats](#), [Aerial Robotics](#)

Projects

Multi Agent Reinforcement Learning for Collective Transport

Work In Progress

WORCESTER POLYTECHNIC INSTITUTE (WPI) [\[NEST LAB\]](#)

July 2021 - Present

- Working with various **value-based** and **policy-based RL methods** to perform **collective transport** under the supervision of Prof. Carlo Pinciroli and PhD candidate Joshua Bloom.
- Evaluating the learned behaviours and analyzing the **resiliency**, **scalability** and **adaptability** of models in different environments.

Controlled Copy-Paste Augmentations for Segmentation Networks

Work In Progress

MANIPAL INSTITUTE OF TECHNOLOGY [\[PROJECT MANAS\]](#)

Feb. 2018 - Present

- Study controlled **copy-paste augmentation** policies and benchmark the effects on the performance of **segmentation networks** using a **custom augmentation library**. [\[code\]](#)
- Benchmarking on various datasets using varying augmentation policies have shown a **3-10% boost** in performance of object detection and segmentation networks.

Pointcloud Copy-Paste Augmentations, Fisheye Camera & SLAM Simulations

Complete

INDIAN INSTITUTE OF SCIENCE (IISc)

July 2020 - July 2021

- Worked on implementing **fisheye cameras** for simulations as well as porting over **SLAM algorithms** for baseline testing along with running **pointcloud semantic segmentation** with **copy-paste augmentations**. [\[code\]](#)

Semantic Segmentation of Wound Images: A Systematic Comparison of Convolutional Neural Networks and AHRF Approaches

DOI 10.1109/ACCESS.2020.3014175

WORCESTER POLYTECHNIC INSTITUTE (WPI)

Jun. 2019 - Aug. 2020

- Co-authored the [paper](#) published in **IEEE Access**, along with Ameya Wagh, Shubham Jain and Prof. Emmanuel Agu, where we evaluated the performances of **AHRF vs CNNs** on a wound segmentation dataset collected at **UMass Medical Center**.
- Compared various pre- and post- processing methods such as CLAHE and CRFs along with different architectures including **dilated convolutions** and **spatial pyramid pooling** while benchmarking on different subsets of the dataset.

Perception System Improvement for Autonomous Buses

Complete

NANYANG TECHNOLOGICAL UNIVERSITY (NTU)

Feb. 2020 - July 2020

- Worked on the **perception system**, mainly **detection algorithms** for the **autonomous bus** which is to be deployed on the streets of Singapore while also implementing a **V-SLAM** pipeline for an indoor ground vehicle under the supervision of Dr. Anshuman Tripathi.

Autonomous Ground Vehicle for IGVC 2018/2019

Completed

MANIPAL INSTITUTE OF TECHNOLOGY [\[PROJECT MANAS\]](#)

Jan. 2018 - Jun. 2019

- Part of the 30 member team that placed **1st at IGVC 2019**, winning the **grand prize** among **25+ teams** from all over the world, and placed **9th at IGVC 2018**. [\[IGVC-2019-results\]](#) [\[IGVC-2019-report\]](#) [\[IGVC-2018-results\]](#) [\[IGVC-2018-report\]](#)
- Headed the perception team responsible for **scene understanding** and mapping the environment around the vehicle for **localization** where different **Computer Vision** and **Deep Learning** approaches to achieve the most desirable results were used.

Self-Driving Car for the Mahindra Rise Prize Challenge

Completed

MANIPAL INSTITUTE OF TECHNOLOGY [\[PROJECT MANAS\]](#)

Feb. 2017 - May. 2019

- **Joint winners** of the competition, beating **153** teams.
- Successfully implemented **Lane Detection**, **Speed Bump Detection**, **Sensor Fusion** amongst other things for Indian roads.
- Continuously involved in other tasks of **Traffic Light and Sign Detection** as well as **SLAM** using a sensor array consisting of **2D/3D Lidars**, **Radars** and **Mono/Stereo cameras**.