

EDUCATION

CARNEGIE MELLON UNIVERSITY, SCHOOL OF COMPUTER SCIENCE
Master of Science in Robotic Systems Development (MRSD)

Pittsburgh, Pennsylvania
Aug 2022 - May 2024 (expected)

SRM INSTITUTE OF SCIENCE AND TECHNOLOGY
Bachelor of Technology in Mechatronics Engineering

Chennai, India
Aug 2015 - May 2019

SKILLS AND CERTIFICATIONS

Languages: C++, Python, C, JavaScript, Matlab

Frameworks and Tools: ROS, TensorFlow, Pytorch, Caffe, Keras, TensorRT, OpenCV, CUDA C++, Docker, Git, Conda

Embedded Systems: Nvidia Jetson, Intel NCS, Variscite, Snapdragon Dragonboard Platforms

Certifications: CS Bridge NYU Tandon (June 2022)

EXPERIENCE

THE HI-TECH ROBOTIC SYSTEMZ LTD.

Gurgaon, India

RESEARCH ENGINEER

Jun 2019 - Jun 2022

Team:- ADAS, Autonomous Driving Technology

- Developed a novel HM-LSTM model to predict early drowsiness using blink features with **92%** accuracy, optimized using TFlite, and deployed it using **ArmNN** on low-cost ARM hardware.
- Improved speed of object detection models by **2.5X** using quantization, pruning, and **TensorRT** without any accuracy loss.
- Created a MobileNetV3 backbone multi-branch network to detect vehicles and segment lanes simultaneously.
- Developed and deployed a Real-Time Traffic Light Detection model with **59% mAP** for the autonomous driving shuttle.
- Enhanced the speed of existing C++ based perception algorithms by 40X using **CUDA C++**.
- Integrated a RADAR to **Novus Aware** device to add a Forward Collision Warning feature. Created a Qt-based GUI tool to visualize objects from Radar, Improved collision warning to be robust using **Bayesian filters**.
- Improved driving data collection pipeline using **AWS IoT** to be **60%** more cost-effective.
- Constructed a real-time web streaming feature (**WebRTC**) for Novus Aware device to stream driving videos to clients.
- Prototyped and devised 6 camera **Surround View System (SVS)** for commercial vehicles.

Team:- Mobile Robotics

- Built a timed mission feature so that the robot could perform a specified task at a given time and integrated it with UI.
- Improved robot localization and loop closure by fusing an IMU using EKF to existing **RTAB-Map** localization.
- Created an **AR Tag detection** algorithm to enable fiducial marker-based navigation for mobile robots.
- Designed various UI features for Robot fleet UI to enhance the user experience of clients using **Ros2djs**.

ZF WABCO

Chennai, India

RESEARCH INTERN (ADAS TEAM)

Jun 2018 - Aug 2018

- Developed an Object Detection model with **54% mAP** to detect vehicles and pedestrians for Indian Scenarios.
- Deployed the model leveraging TensorRT on a Jetson TX1 with **23 FPS**.
- Dealt with class imbalance using Focal Loss and significantly improved object detection accuracy.
- Implemented a verification algorithm to efficiently validate objects from radar and camera with ground truth.

TECHNICAL PROJECTS

Semantic Vehicle Action Recognition | SRM University

Dec 2018 - May 2019

- Developed a Detection-based Tracking approach (YOLO + DeepSORT) to detect and identify vehicles. Implemented an optical flow algorithm to get the directional vectors of consecutive frames.
- Customized LaneNet for segmenting the drivable area into ego lanes as well as opposite lanes.
- Combined detection, tracking, optical flow, and drivable area to build a decision tree that could classify and determine a vehicle's action such as lane change, or lane keep.

Efficient Video Instance Segmentation | Independent

Aug 2018 - Dec 2018

- Modified MaskTrackRCNN's backbone architecture using MobileNetV2 to make it more efficient.
- Consolidated large driving dataset by merging various open-source datasets such as BDD 100K, IDD, CityScapes, etc.

R-Tree based efficient GPS location access method | Independent

Mar 2018 - Jun 2018

- Implemented an R-Tree for efficient GPS location querying of accident prone locations in indian highways .