Vaishanth Ramaraj

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Domain skills: Robot Perception, Computer Vision, Mapping, Localization, Deep Learning, Artificial Intelligence

EDUCATION

University of Maryland **College Park, MD**
M.Eng, Robotics Engineering | GPA: 3.63/4 *May, 2023*

- **Selected Coursework:** Perception and Planning for robotics, Foundations of Deep Learning and ML, Robot modeling, ROS software development in Cpp and Python, and Basic Control systems.

Kongu Engineering College **Perundurai, India**
B.E, Mechatronics Engineering | CGPA: 8.36/10 *2016 – 2020*

TECHNICAL SKILLS

Programming Languages: Python, C++, MATLAB
Libraries and Tools: Pytorch, Tensorflow, Sklearn, Pandas, Numpy, ROS, OpenCV, Git, Docker, Django, Dart
ML Architectures: KNN, SVM, Softmax, Multilayer Perceptron, CNN, YOLO, Transformers, RAFT
Other Tools: SolidWorks, AutoCAD

WORK EXPERIENCE

Children's National Hospital **Jun - Aug 2022**
Research Assistant *DC, USA*

- Designed and developed an inexpensive($<$ 700USD), compact (6in x 4in x 3in), modular navigation system to provide autonomous functionality for a powered wheelchair using Jetson Nano and Realsense Camera.
- Executed visual SLAM for mapping and localization using RTABmap's ROS package and real-time path planning is executed using move base package at an average 35FPS with less than 10W power consumption.
- Submitted a journal paper to Journal of Signal Processing Systems named "Development of a Modular Real-time Shared-control System for a Smart Wheelchair".

Bariflo Labs pvt ltd **Mar - Jun 2021**
ROS Software Developer *Chennai, India*

- Developed ROS package on Raspberry Pi for remotely controlling a Water Aeration Robot using onboard WiFi with a range of 20 meters.
- Environmental data was fetched from the attached sensors at every 10 seconds, which then processed using Regression algorithms on the cloud with latency of 160ms to trigger the aeration process.

PROJECTS

COVID19 Social Distancing Violation Detector: Detected people crowding in public areas to indicate high risk of COVID-19 exposure using **YOLOv5** in **pytorch** with a real time performance of 45 FPS which is 2.5 times faster than Faster-RCNN and has more than 90 percent accuracy is achieved. GitHub

Product review analysis using Trasformers: Provided Amazon product recomendation using **Transformers (Pytorch)** trained on 70,0000 product reviews fetched using **Webscraping** for the user to make an informed decision. GitHub

Image Classification: Implemented image classification on 60,000 CIFAR-10 image datasets to classify images into 10 classes using **KNN**(27% acc), **SVM**(36% acc), **Softmax**(37% acc), **Multi-layer Perceptron**(51% acc), **Convolutional Neural Network**(78% acc)(Both Pytorch and Tensorflow Implementation. GitHub

Water level detection for Ship hull: Estimated water level on ship hull upto 10 meters using **RAFT (Pytorch)** algorithm (estimate the optical flow of water) and **OpenCV** library (perform post image processing) which performed 2 times faster than conventional optical flow providing consistent 30 FPS only using single RGB camera data. GitHub

Lane Detection and Turn Prediction: Detected road lanes using Homography and sliding window approach in real-time at 40 FPS and made turn predictions based on the curvature of the road with an error rate less than 10%. GitHub

Robot Path Planning: Demostrated path planning for holonomic and non-holonomic robots in simulation using python implementation of **BFS, DFS, Dijkstra, A*, RRT, RRT* and bi-RRT** algorithms . GitHub

ACHIEVEMENTS & EXTRACURRICULAR ACTIVITIES

- Published Gedrag Organisatie paper "Design and Development of Spherical Robot" - 2020
- Event Coordinator in English Proficiency and Readers Club (2018 - 2019).
- Executive member in Robotics Club (2017 - 2018).