Himadri Roy

Buffalo, NY **|** (716)907-8955 **|** himadrir@buffalo.edu | linkedin.com/in/himadriroyy/ **|** github.com/himadrir

EDUCATION

University at Buffalo, NY

Master of Science, Engineering Science (Robotics)   Aug. 2021 – Dec 2022

Coursework: Deep Learning, Machine Learning, ROS, Computer Vision, and Image processing,
Learning for Autonomous System, Reinforcement Learning, Robotics I(Robotic arm 3-6DoF, PID, MPC)

Fr. C. R. Institute of Technology, Mumbai, India

Bachelor of Engineering in Electronics and Telecommunication   Aug. 2015 – May 2019

Coursework: Microprocessors and Microcontrollers, Operating Systems, Data Structures, Image Processing

EXPERIENCE

University at Buffalo, *Research Assistant*   Mar 2023 – Present
- Implementing and testing various visual SLAM for F1 1/10 for racing and overtaking.
- Applied SegNet on Jetson Xavier to segment the objects and then object detection module trained on ego car images was used to get robust tracking and accuracy and performance of 91% and 18 fps respectively.

University at Buffalo, *Graduate Teaching Assistant*   Aug 2022 – Dec 2022
- Worked as a Graduate Teaching assistant for the course "Road Vehicle Dynamics".
- Assisted with course delivery, including facilitating class discussions, grading assignments, and exams, and providing individual support to students.

Reliance Payment Solution Ltd (JioMoney), MH, India, *IoT and Cloud Computing Intern*   May 2018 – Aug. 2018
- Implemented RTOS to manage reading sensors and logging the data via WiFi module. A watch dog timer was implemented to reset the system in order to make it robust along with error logging(32-bit LX6 microprocessor)
- Contributed to a project, to log employee movements through RFID and developed a heatmap of the office showing crowded and uncrowded places (to help with planning lunch times/breaks, to save time by avoiding long queues).

TECHNICAL SKILLS

Programming Languages: Python, C++11/14, MySQL
Platforms: ROS, OpenCV, OpenAI Gym, Solidworks, Jupyter Notebook, RTOS, EagleCAD
Modules: PyTorch, TensorFlow, Keras, Pandas, Scikit-Learns, GTSAM, PointCloud Library(PCL), Boost

PROJECTS

Self-Driving RC Car (F1Tenth), *Skillset used: ROS, Gazebo, Path Planning (A*, RRT), Arduino, Python, C++14*
- Quantified various Visual SLAM algorithms (OpenVINS-Mono, SVO, DSO, RTABmap) and cameras (global shutter vs rolling shutter) to find the best performing and low computation-cost algorithms to run on Xavier NX.
- Implemented Particle filter to run on GPU for localization node.
- Developed car detection by training yolov5 to detect ego car with images from D455 Stereo Camera and obtained an accuracy of 88.98% in detection and tracking.
- Implemented a low-level controller to monitor battery, status light using Teensy 4.0 and RTOS(ARM Cortex M7) which communicated via rosserial.

Visual Odometry using Monocular camera*, Skillset used: OpenCV, Python*
- Developed a baseline algorithm that used the KITTI-dataset, to calculate odometry using one camera.
- Implemented FAST algorithm for feature extraction.
- Applied Nister's 5-point algorithm with RANSAC to find essential matrix which was used to estimate Rotational and Translational vectors. A deviation of 7.8% was obtained in the result as compared to the ground truth.

Blood delivery system using Drone, *Skillset used: ROS, Gazebo, Path Planning(A*), Python, C++14, OpenCV, Arduino*
- Implemented precision landing using AruCo markers and an underside camera, with assistance from GPS, on a drone controlled by a Pixhawk flight controller and commanded by a Raspberry Pi 3B.
- Navigated in GPS-denied regions using Lidar, Hector SLAM for mapping, and MAV-ROS for navigation.

A*, RRT and bug algorithms on Gazebo, *Skillset used: ROS, Gazebo, Path Planning, Python*
- Implemented basic Bug algorithms on gazebo, on a differential drive robot with a 2D lidar.
- Implemented A* and quantified its performance with RRT and RRT*.
- Applied RANSAC to scan data to remove outliers (noise) and connect the scan data to percept the environment.