Himadri Roy

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

EXPERIENCE

University at Buffalo, *Research Assistant* *03/2023 – Present*

- *Developed learning based methods for Visual Odometry frontend to run on compute constrained hardware.*
- *Optimized the Autonomous Vehicle's perception stack of the racecar with faster and robust pose tracking, leveraging learning methods and classical methods.*

University at Buffalo, *Graduate Teaching Assistant (Road Vehicle Dynamics)* *08/2022 – 12/2022*

- *Assisted a class of 110 students comprising of undergraduates and graduates with course delivery, including facilitating class discussions, grading assignments, and exams, and providing individual mentoring to students.*

TATA Consultancy Services (TCS), *Associate Software Engineer* *06/2019 – 07/2020*

- *Boosted testing productivity by 35% through automated document testing saving using Python and Selenium.*
- *Enhanced Agri-Loan website performance by 40% via code optimization (drop-down menu loading).*
- *Delivered quality software in an Agile CI/CD environment (GitLab) via collaboration, code review and feedback.*

EDUCATION

- **University at Buffalo,** *Master of Science, Engineering Science (Robotics)* *08/2021 – 02/2023*
  Coursework: *Machine Learning, Computer Vision, Learning for Autonomous Systems, Reinforcement Learning, Robotics Algorithms, Continuous Control Systems*
- **University of Mumbai,** *Bachelor of Engineering in Electronics and Telecommunication* *08/2015 – 05/2019*

PROJECTS(himadrir.github.io)

Autonomous Race Car (F1Tenth), Skillset: ROS, Gazebo, Path Planning, Arduino, Python, C++

- *Developed Particle filter for Mapping & Localization stack.*
- *Improved car tracking by in terms of inference time by 20% with lightweight faster models like YOLOv5-Lite.*
- *Implemented Pure Pursuit Controller in C++ as global planner for Controls Stack of the car.*
- *Increased robustness of odometry data by implementing sensor fusion using Extended Kalman Filtering.*

Visual Odometry using Monocular camera, Skillset: OpenCV, Python, PyTorch

- *Developed baseline algorithm by formulating a Structure from Motion problem using OpenCV functions.*
- *Decreased error by 12% in odometry calculation by utilizing SuperPoint-Lightglue model for feature extraction and matching.*

PoseNet++, CNN based frontend for Visual Odometry, Skillset: Python, PyTorch, Pandas

- *Implemented a modified VGG16 network with Dense Layers fine-tuned to regress pose of a given image of a sequence.*
- *Achieved an accuracy of 74% with no backend optimization like loop-closure on KITTI and King's College Datasets.*

ADAS system for Autonomous Vehicles, Skillset: Instance Segmentation, Python, PyTorch, CARLAsim

- *Accurate lane and vehicle perception: Implemented Lane-Net for lane segmentation and YOLOv5 for robust car detection and tracking.*
- *Efficient 3D lidar odometry: Optimized lidar data handling using Iterative Close Point (Open3D) and NumPy for real-time processing.*
- *Implemented RRT with Reeds-Shepp optimization for path planning and time-to-collision which was available to user as HUD information.*

3D scene reconstruction using RGBD camera, Skillset: ROS, Open3D, C++, CARLAsim

- *Implemented a pipeline with D455 stereo camera to obtain PointCloud data.*
- *Obtained a voxel grid map of the environment using Open3D for visualization and efficient data handling.*
- *Utilized PnP-Ransac method to solve the problem of Structure from Motion.*

EXTRA-CURRICULUM

- *Led a team of 10 people responsible for Algorithms Design for the robot for ABU Robocon 2018.*
- *Participated and won in multiple Drone Racing Events organized by Indian Drone Racing League.*
- *Represented India in PUBG eSports competitions in Thailand, Singapore and Dubai and various regional events leading the team as the in-game leader.*

TECHNICAL SKILLS

- **Languages:** *Python, C++11/14, SQL, Java, MATLAB*
- **Platforms:** *ROS, OpenCV, Jupyter Notebook, EagleCAD, Solidworks*
- **Modules and Tools**: *PyTorch, TensorFlow, Keras, Pandas, Scikit-Learn, Open3D, PCL, Gazebo, CARLAsim*