Sai Venkatesh Balaji

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EDUCATION

Northeastern University — Boston, USA
Master of Science in Robotics, Mechanical Concentration | GPA: 4.0/4.0 — *Sep. 2023 – Present*
Coursework: Mobile Robotics, Robot Sensing and Navigation, Computer Vision

Birla Institute of Technology and Science, Pilani — Hyderabad, India
BE Mechanical Engineering, Minor in Robotics and Automation | CGPA: 8.51/10 — *Aug. 2018 – May 2022*
Coursework: Robotics, Artificial Intelligence for Robotics, Modern Control Systems

TECHNICAL SKILLS

Programming Languages: Python, C/C++, MATLAB
Frameworks: Scikit-Learn, Numpy, Pandas, Tensorflow, OpenCV
Designing and Simulation: ROS, Gazebo, MATLAB/Simulink, SolidWorks

WORK EXPERIENCE

Technological Innovation Hub, IIT Bombay — Nov. 2022 – May 2023
Project Research Assistant — *Mumbai, India*
- Collaborated with a team of six to develop ground robots for precise navigation in agricultural fields, optimizing field coverage and operational efficiency
- Implemented path planning on an Unmanned Aerial Vehicle (UAV) across an agricultural field using Probabilistic Road Map (PRM) and A* Algorithm
- Simulated the navigation of the robot using Robot Operating System (ROS) and Gazebo

Centre for Artificial Intelligence and Robotics (CAIR-DRDO) — July 2021 – Dec. 2021
Project Trainee — *Bangalore, India*
- Modeled the dynamics of an Autonomous Ground Vehicle whose steering wheel was actuated by a DC Motor
- Conducted a literature review of path tracking control schemes and path planning algorithms
- Built a control strategy based on Model Predictive Control (MPC) for path tracking in MATLAB/Simulink
- Assessed the effectiveness and performance of the control scheme through simulation using CarSim, ensuring precise path tracking capabilities

PROJECTS

Localization of Multiple Mobile Robots using Aruco Markers | *Python, OpenCV, ROS*
- Teamed up with three people to construct a fleet of ground robots, each equipped with an ArUco marker mounted on top
- Performed Aruco marker detection utilizing a ceiling-mounted camera, enabling precise localization of the robots using OpenCV and Python
- Implemented multi object tracking using CSRT based on the initially detected ArUco markers

Visual SLAM and Dead Reckoning | *ROS, Python, MATLAB*
- Captured real-time odometry and camera data from Northeastern University's autonomous car (NUANCE)
- Implemented Visual SLAM using ORBSLAM3 on the collected rosbag and estimated the Yaw and Forward Velocity using the IMU and GPS data

Point Cloud Registration using ICP Algorithm | *Python*
- Implemented the Iterative Closest Point (ICP) algorithm in Python and successfully applied the algorithm to the Stanford 3D Scanning Repository dataset, achieving precise point cloud registration

PUBLICATIONS

Inturi, V., **Balaji, S. V.**, Gyanam, P., Pragada, B. P. V., Sabareesh, G. R., & Pakrashi, V. (2022). An integrated condition monitoring scheme for health state identification of a multi-stage gearbox through Hurst exponent estimates. Structural Health Monitoring-an International Journal, 22(1), 730–745. https://doi.org/10.1177/14759217221092828.