

Simson D'Souza

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Education

- Carnegie Mellon University - School of Computer Science** Aug 2024 - May 2026
M.S. in Robotics Systems Development (MRSD) - GPA: 4.2/4.0
Pittsburgh, PA
- **Coursework:** Computer Vision, Optimal Control and Reinforcement Learning, Deep Learning, Learning for 3D Vision
- Hindustan Institute of Technology and Science (HITS)** July 2019 - April 2023
Chennai, India
- B.Tech in Mechatronics with Honors in Satellite Technology* - GPA: 9.98/10.0
- **Academic Honors:** Awarded the gold medal for securing 1st rank in Mechatronics Engineering
 - **Coursework:** Control Systems, AI for Mechatronics, Motion Control, Machine Learning, Tools for Data Science

Technical Skills

Programming & Platforms: Python, C/C++, Jupyter, Linux, Zsh & Bash, Git, Object Oriented Programming, Data Structures and Algorithm Design, Software Development, CI/CM Revision Control, Nvidia Jetson, Raspberry Pi

Libraries: OpenCV, Pandas, Numpy, Scikit-learn, SciPy, Issac Gym, Point Cloud Library (PCL)

Software Tools: ROS/ROS2, MATLAB, Simulink, MuJoCo, MoveIt, Gazebo, Docker, Solidworks, Fusion 360, AWS

Machine Learning & Robotics: Kinematics, Motion & Path Planning, SLAM, Autonomous Navigation, 3D Mapping & Image Processing (Realsense, Zed 2i & FARO Laser Scanner), Object Reconstruction, Reinforcement Learning, Sensor Fusion and Calibration, Manipulators (Franka, Kinova Jaco, Doosan Cobot)

Experience

- Machine Learning Engineer Intern, AIM Intelligent Machines - Redmond, Washington** May 2025 - August 2025
- Developed a real-time monitoring system to detect map instability using quantitative metrics, reducing manual inspection efforts by 90% and significantly improving system reliability.
 - Implemented an offline replay-based KISS-ICP SLAM framework for LiDAR calibration validation with defined metrics to assess localization accuracy and map quality, delivering optimized mount offsets and enhancing map consistency; transitioned testing from online to offline, cutting validation time by 95%.
- Robotics Engineer Intern, Void Robotics - Marathon, Florida (Remote)** April 2024 - July 2024
- Revamped ROS2 navigation for Voidwalking robot by implementing automatic waypoint generation and GoogleTest unit tests, improving repeatability and operational reliability through remote simulations.
 - Utilized C++, Python, and Bash to debug and optimize path planning, firmware, sensor fusion, and Docker-based systems.
- Robotics Engineer Intern, Coboticca Automation Pvt Ltd - Mumbai, India** [Link](#) Dec 2022 - July 2023
- Developed an autonomous vending machine and delivery robot system for guest supplies, with a Plotly Dash web app for orders and AWS IoT for communication, boosting order speed by 40% and repeat orders by 15%.
 - Implemented an ArUco marker-based docking algorithm and notification system to alert staff of stockouts, using QR code detection with OpenCV for secure access, optimizing inventory management and delivery experience.
 - Improved path planning within ROS1 by using the TEB local planner and fine-tuning navigation parameters, achieving a 20% increase in navigation efficiency. Led the transition from ROS1 to ROS2, boosting overall system performance.

Projects

- Lunar ROADSTER (CMU Robotics Institute)** [Link](#) Sept 2024 - Present
- Developing an autonomous moon rover for lunar exploration, focused on building surface trails. Utilizing FARO laser scanner and Zed 2i camera for terrain mapping, processing point cloud data with PCL, defining reference planes with RANSAC to identify craters as obstacles in a 2D costmap, and working on dynamic mapping and navigation using Nav2.
 - Building a custom PID-based pure pursuit controller optimized for lane distance and direction to achieve lane following.
- Multi View 3D Reconstruction (CMU Robotics Institute)** Oct 2024 - Dec 2024
- Engineered 3D reconstruction of mobile objects for tracking different objects in a mobile camera feed using Faster RCNN with sequential bundle adjustment and preconfiguration of view transforms and the eight point algorithm.
- Task Allocation Algorithm for Autonomous Warehouse Robot (HITS)** [Link](#) June 2022 - Nov 2022
- Coordinated TurtleBot3 robots with a centralized ROS1 controller, derived a battery drain equation, and designed a Python task allocation algorithm optimizing assignments based on completion time, robot status, and battery level

Publications

- **Development of Interactive Visual Recognition Assistant Bot - IEEE International Conference on Artificial Intelligence and Knowledge Discovery in Concurrent Engineering (ICECONF) 2023** [Link](#)