Siddarth Narasimhan

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Languages: Python, C++, CMake, MATLAB, SQL
Technologies: ROS, ROS2, Linux, Git, Docker, Gazebo, RViz, PyTorch, OpenCV, Autodesk Fusion

Education

University of Toronto – MASc. Robotics Sept 2023 - Apr 2025
• **Focus:** Deep Learning and Reinforcement Learning for Robot Control and Map Inference

University of Toronto – Engineering Science (BASc) Sept 2018 - Apr 2023
Robotics Engineering Major, Artificial Intelligence Minor
• **Thesis:** Contrastive Learning for Map Inference in 3D Environments via Trajectory Map Pretraining
• **Capstone:** Designed a drone capable of waypoint navigation (pure-pursuit) and obstacle avoidance (stereo depth, colour processing) on a PixHawk4/ROS platform. Awarded for achieving smoothest flight.
• **Robot Control:** Forw. and Inv. Kinematics and Motion Planning on KUKA and PUMA 6DoF Manipulators

Experience

Autonomous Systems and Biometrics Lab – Robotics Research Student May 2022 - Aug 2023 (16 months)
Robotics // ROS, Gazebo, RViz, Python, C++, OpenCV, PyTorch
• Developed robust simulator to enable multi-robot exploration, SLAM, and map inference. Achieved 30% runtime improvement over off-the-shelf solutions, enhancing efficiency in real-time operation
• Conducted comprehensive literature review in map inference to identify opportunities for research
• Invented a novel architecture for 3D map inference using contrastive learning, demonstrating a 60% improvement in accuracy and information gain compared to state-of-the-art approaches

Advanced Micro Devices – Power Design and Firmware Engineer May 2021 - Apr 2022 (12 months)
GPU Data Center // C++, Python, LTSpice, Cadence, MATLAB, Autodesk Fusion
• Evaluated 50+ GPUs using metrics including power loss, over current protection, and dynamic response to identify component improvements, leading to a 15% boost in overall GPU performance
• Led the design and implementation of a software to automate the generation, transmission and receiving of I2C/SMBUS byte packets, resulting in a 75% improvement in debugging capabilities
• Presented the innovative software solution to the VP. The project is estimated to drive over $1M in revenue through streamlined GPU production processes, highlighting its success and impact
• Recognized with the Spotlight Award for extraordinary contributions as a co-op student

Ministry of Transportation – Data Science Intern Jun 2020 - Aug 2020 (3 months)
Systems Analysis and Forecasting // Python, PyTorch, TensorFlow
• Developed an intelligent transportation system, leveraging GPS data and deep learning to obtain live traffic volume estimates, resulting in 10% improvement in accuracy over state-of-the-art methods
• Designed a novel time-stamp detection and recognition pipeline with a 94% overall accuracy

Ministry of Government and Consumer Services – Data Analyst Jun 2018 - Aug 2019 (7 months)
Supply Chain Analytics // Excel, Access, Visual Basic, SQL, Power BI
• Designed a macro-powered database to analyze/summarize 5000+ spend transactions by ministries

Notable Projects

RRT Playground – Rapidly Exploring Random Trees Simulator
C++, CMake, Eigen, SFML
• Efficient implementations of RRT and its variants including RRT*, Anytime RRT and Informed RRT*

RobotVision – A Simulator to Explore Algorithms in Robotics
Python
• Developed an interactive program to simulate path planning, control and localization of a 2D robot
• Implementation features PID control, lead-lag control, Extended Kalman Filter, Unscented Kalman Filter and SLAM, with detailed explanations, mathematical derivations and demonstration videos