RAGHURAM CAULIGI SRINIVAS

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EDUCATION

New York University — **New York**
M.S. Electrical Engineering — **May, 2025**

Birla Institute of Technology and Science (BITS), Pilani — **Hyderabad, India**
B.E.(Hons.) Electrical and Electronics Engineering — **May, 2023**

SKILLS

- **Programming Languages:** Python, C++, CUDA, MATLAB, Bash.
- **Robotics Hardware:** NVIDIA Jetson Orin, Intel RealSense D455, PX4 Autopilot, IMUs, Stereo/Monocular Cameras.
- **Perception & Estimation:** OpenCV, Open3D, NVBlox, OpenVINS, Kalibr, DepthAnything, Visual Odometry, Sensor Fusion.
- **Deployment & System Tools:** ROS, ROS2, Docker, CMake, Linux, ONNX, TensorRT, Git, NVIDIA Nsight.
- **Machine Learning & AI Frameworks:** PyTorch, TensorFlow, Keras, Hugging Face, Scikit-learn, NumPy, SciPy, Pandas.

WORK EXPERIENCE

Graduate Research Assistant — Nov 2023 – May 2025
Agile Robotics and Perception Lab (ARPL), NYU — *New York*

- Spearheaded the development of a full-stack autonomy pipeline in ROS2 (C++/Python) on NVIDIA Jetson Orin, leading the transition from JetPack 5.1 to 6.2 and deploying real-time perception and mapping enhancements with NVBlox for safer obstacle avoidance in field environments.
- Built and calibrated robust visual-inertial odometry (VIO) systems using Kalibr and OpenVINS in ROS2, achieving precise sensor synchronization and coordinate frame alignment critical for accurate robot state estimation.
- Tuned state estimation parameters and filtering logic in OpenVINS to achieve sub-5cm localization accuracy during aggressive minimum-snap trajectory execution, enabling precise aerial navigation in dynamic test scenarios.
- Integrated GPS data with VIO through EKF2 to extend localization to outdoor settings, improving resilience in GPS-degraded and cluttered environments—critical for real-world, long-range deployments.

AI Software Engineer — June – Aug 2024
ScoutOS Inc — *Remote*

- Built a real-time evaluation pipeline for LLM agents using LangChain and DeepEval, enabling continuous hallucination and relevance tracking through automated dashboards.
- Reduced hallucination rate by 30% by deploying a cloud-native model evaluation system on GCP, with precision and recall metrics integrated into agent feedback loops.
- Designed a graph-based retriever backed by vector databases (Postgres + pgvector), improving semantic matching and boosting RAG performance on structured queries.
- Delivered production-ready tools to monitor agent behavior at scale, flagging 10+ regressions weekly and improving response consistency in live environments.

PROJECTS

Safe UAV Navigation via Learned Depth Completion — GitHub | Publication
C++, Python, ROS2, Jetson Orin — *Nov 2024 – May 2025*

- Built a robot perception system utilizing RGB-Images and a depth completion module, enabling autonomous navigation of a drone in unstructured environments.
- Designed an algorithm that generates dense, low-noise point clouds using only rgb images by fusing learning-based monocular depth estimation with a commercial stereo matching algorithm, achieving a 2x improvement in overall point cloud quality (longer range, lower noise, and higher structural consistency) compared to standard pipelines.
- Engineered a real-time shortest-path planner for unknown environments, designed with inherent safety guarantees through pre-trajectory safe flight corridor generation. This graph-of-convex-set-based solution outperforms the state-of-the-art MINCO by 20% and scales efficiently with the complexity of the map.
- The system was validated in indoor (GPS-denied) and outdoor scenarios under varying lighting conditions and harsh winds of up to 15 mph, demonstrating reliable navigation over areas up to $60m \times 40m \times 3m$.

Autonomous Navigation for AGVs in Simulated Warehouse Environments — GitHub
Python, OpenCV, NumPy, Linux — *Aug – Dec 2023*

- Simulated AGV navigation in warehouse-like maze environments with constrained visibility, tight corridors, and dynamic obstacle scenarios.
- Built a vision-only navigation stack with ORB-based visual odometry, egomotion fusion, and real-time occupancy grid mapping for localization and planning.
- Implemented trajectory smoothing and PID-inspired control to ensure smooth motion and accurate turns in narrow aisles and blind spots.
- Emulated PLC-style task sequencing using Python scripts to trigger movement logic and replicate industrial automation behavior.
- Evaluated system robustness via custom testing scripts that measured path accuracy, drift tolerance, and recovery from dead-ends; ranked top 10/40 in a competitive robotics challenge.