Vinay Lanka

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Education

University of Maryland   **Expected: May 2025**
Master of Engineering (M.Eng.) - Robotics   *College Park, MD*
- GPA - 4.0
- Research Areas: Computer Vision, Perception, Localization, Navigation, Path Planning, Multi-Agent Systems

Vellore Institute of Technology   **Sep 2017 - Jun 2021**
B. Tech - Electronics and Communication Engineering   *Vellore, TN*
- GPA - 8.83/10
- Technical Lead of the IEEE VIT Student Chapter

Experience

Parsons   **Jun 2024 − Aug 2024**
Drone Program Intern   *Denver, CO*
- Developed various approaches (SFM, NeRF, Gaussian Splatting) for 3D reconstruction from UAV site surveys for the DoL.
- Created Parsnip, a tool for facility inspections that matches IR-RGB images via homography and EXIF metadata, decreasing dataset review time, with smart annotation tools for drawing polygons, text, and arrows.
- Assisted in setting up and troubleshooting the Clearpath Husky A200 robot as part of the Geophysics team, implementing the Outdoor Nav software stack.

Newspace Research and Technologies   **Jan 2023 − July 2023**
Robotics Engineer   *Bangalore, IN*
- Developed solutions for image projection, and orthorectification of UAV feeds onto a map. Developed an end-to-end near real-time image stitching pipeline integrated with the fixed-wing swarming stack.
- Develop a standardized pipeline for accessing aerial camera feeds with metadata in simulation following the MISB 0601 KLV standard.
- Successfully integrated the Epsilon E175 EO/IR camera with a prototype VTOL and tested object tracking and geolocating algorithms.

Neoflux (Part of TI DMG GmbH)   **July 2021 − December 2022**
R&D Robotics and IoT Engineer   *Bangalore, IN*
- Protection One (Client) - Developed MVP and production-grade multithreaded VOIP carrier board with G711 alaw encoding and encryption based on the Raspberry Pi CM4 module with suitable audio recording, processing, and playback components.
- Autonomous Land Mapping Robot - Designed and built a fully autonomous robot for 3D mapping with custom chassis, electronics and algorithms. Implemented 2-stage EKF (local and global) with RTK GPS for precise position estimates.
- Developed a set of internal Robotics, Edge ML, and IoT projects for Neoflux (R&D TIDMG GmbH)

Projects

Drone Visual Particle Filter (CamDroneLoc) | *PyTorch, OpenCV, Gazebo, PX4, Python*   **May 2024**
- Developed a novel particle filter for drone localization and odometry prediction using visual image encodings (CNN, VecKM, histogram of feature encodings) as measurement readings.
- Implemented, tested, and optimized the model in a Gazebo PX4 SITL world, demonstrating improved drone positioning accuracy.

EV Charging Bot | *ROS2, Python, OpenCV, PCL, Velocity Kinematics*   **December 2023**
- Developed an EV Charging Bot based on the FANUC CRX-10iA/L cobot that can dock to a charger using a Stereo camera based perception system.
- The perception system generates a goal in 3D space from a video feed and an velocity IK based solver designed from scratch generates and executes a real-time trajectory using the SRI Jacobian inverse method using Damped Least Squares.

HDAL: Human Detection and Localization | *C++, OpenCV, CMake*   **October 2023**
- Designed and deployed a geometric computer vision algorithm that uses intrinsic camera parameters and pixel information from bounding box information detected using a YOLO v5 model to get accuracy levels greater than 95% for calculated human coordinates relative to the robot's camera.

Disturbance Compensating Model Predictive Control | *Quadratic Optimization*   **November 2023**
- Wrote a comprehensive report and implemented the paper by Z. Li and J. Sun, "Disturbance Compensating Model Predictive Control With Application to Ship Heading Control"

Publications

V. Lanka, V. B, D. Vinjamuri and B. Bhattacharyya, "Designing and Implementing Robot-Web-Suite, A Cloud Based Robotics Platform," 2021 IEEE International Conference on Robotics, Automation, Artificial-Intelligence and Internet-of-Things (RAAICON), Dhaka, Bangladesh, 2021, pp. 46-49, doi: 10.1109/RAAICON54709.2021.9929637.

Technical Skills

Languages: C, C++, Python, GoLang, JavaScript
Frameworks / Platforms: PyTorch, Tensorflow, Keras, OpenCV, NodeJS, ESP-IDF, Raspberry Pi, Jetson Orin, Arduino, ESP32
Software/Tools: ROS2, ROS1, Gazebo, CMake, Git (Version Control), CI/CD, GoogleTest, Docker, Kubernetes, SolidWorks