Priyanshu Ranka

Boston, MA | +1 857-397-7460 | ranka.pr@northeastern.edu | LinkedIn | Github

Education:

Northeastern University — **Boston, MA**
Master of Science (M.S.) in Robotics — Sept. 2024 - Present
Coursework: Machine Learning, Robot Perception and Navigation, Reinforcement Learning, Image Processing

SRM Institute of Science and Technology — **Chennai, India**
Bachelor's in Technology (B. Tech) in Mechatronics Engineering — Sept. 2020 - Jun. 2024
Coursework: Sensor and Actuator Technology, Control System, Machining, Computer Vision

Skills:

- **Technical Knowledge:** C, C++, Python, ROS, ROS2, HTML, CSS, Git, CI/CD, Agile, Jira
- **Machine Learning Libraries:** Keras, OpenCV, TensorFlow, PyTorch, Seaborn, Matplotlib
- **Design Tools:** SolidWorks, ANSYS, AutoCAD, MATLAB and Simulink
- **Office Tools:** MS Word, Excel, PowerPoint, Outlook

Academic Projects:

Object Detection and Augmented Reality — **Jan. 2025 – Feb. 2025**
Skills- C++, Python, Computer Vision, Image processing, OpenCV libraries, Camera Calibration, Git

- Developed a computer vision system integrating camera calibration, augmented reality, and 2D object recognition, using intrinsic and extrinsic calibration for accurate sensor fusion, distortion correction, and real-world alignment with OpenCV and C++
- Designed a robust object recognition pipeline for feature extraction to ensure scale, rotation, and translation-invariant detection, using nearest-neighbor and KNN for improved classification of objects
- Utilized projective geometry and perspective transformation to overlay augmented 3D objects, ensuring consistent orientation and interaction with the scene, while optimizing system performance for real-time automation and precise object tracking

Content-Based Image Retrieval and Real-Time Image Processing — **Jan. 2025 – Feb. 2025**
Skills- C++, Python, Image Enhancements, Computer Vision, CBIR, Git, Version Control

- Built and evaluated a Content-Based Image Retrieval (CBIR) system, comparing deep learning and classical methodologies for effective image retrieval with documentation and analysis of the performance of various algorithms
- Engineered real-time image and video processing applications using OpenCV using advanced techniques such as object detection and depth estimation using pre-trained models and ONNX Runtime
- Applied Sum of Squared Differences (SSD) and other distance metrics for similarity measurement in image retrieval, demonstrating a foundation in mathematical modeling

Environment Mapping for Autonomous Cars Using ORB-SLAM3 — **Sept. 2024 – Dec. 2024**
Skills- C++, Python, OpenCV, TensorFlow, ROS2, Monocular and Stereo Cameras, Linux, LiDAR

- Streamlined ORB-SLAM3 using Python for visual-inertial odometry, achieving real-time camera pose estimation and mapping
- Employed OpenCV and TensorFlow for feature extraction and tracking, improving localization robustness by 30%
- Conducted stereo and monocular camera-based environment mapping and validated performance on the NUANCE Stereo dataset, achieving 95% feature tracking proficiency and precise 3D map construction

Autonomous Mapping and Navigation Simulation — **Jul. 2023 – Dec. 2023**
Skills- C++, Python, SLAM, Path Planning, SolidWorks, ROS – Gazebo, MATLAB, Simulink, Navigation

- Demonstrated SLAM-based mapping algorithms in C++ and Python within ROS-Gazebo, integrating real-time obstacle detection, adaptive path-planning, and motion control strategies to enhance autonomous robotic navigation
- Designed and validated simulation environments in MATLAB, Simulink, and ROS-Gazebo, ensuring accurate testing of sensor fusion, mapping and localization strategies in diverse scenarios like industrial environments

Professional Experience:

Research Assistant — **Dec. 2023 – May 2024**
Electrohub – An Autonomous Docking System for Electric Vehicles — **Chennai, India**

- Implemented machine learning algorithms using Python and TensorFlow for high-precision computer vision applications, automating the electric vehicle (EV) charging process and achieving 92% precision in detecting and localizing EV charging ports
- Annotated over 1,000 images using LabelImg and trained the SSD-MobileNet-V2 model, supervised learning for object detection, instance segmentation, and semantic segmentation, resulting in precise identification of side charging port
- Enabled real-time classification that reduced human intervention boosting the capability of the autonomous docking system

Software Assistant — **Jun. 2022 - Aug. 2022**
Dimple Polyfilms — **Ahmedabad, India**

- Partnered with a software engineer to build and deploy a comprehensive stock tracking solution, covering production, office exports, purchases, and sales, which successfully reduced stock discrepancies by 15%
- Performed comprehensive validation, extensive debugging, and precise data entry for over 2,000 stock records spanning 8 diverse products, ensuring exceptional reliability and streamlined inventory management processes
- Authored comprehensive user guides and facilitated training for 6+ employees, resulting in improved operational efficiency