SHREYAS DEVDATTA KHOBRAGADE

Worcester, MA | 7745252402 | skhobragade@wpi.edu | LinkedIn | Github | Portfolio

SUMMARY

Robotics Perception Engineer with skills in electronics and embedded systems. Experienced in development of sim-to-real pipelines for autonomous drone navigation in GPS-denied and low-light environments, integrating vision-based dense depth estimation. Skilled in C++ and Python. Proven ability to optimize real-time performance on Edge Computing boards.

EDUCATION

Worcester Polytechnic Institute **Aug 2024 - May 2026**
Master of Science, Robotics Engineering (GPA: 4.0) *Worcester, MA*
- **Achievements:** Received Dr. Glenn Yee Graduate Student Project Award, EDU Bridge Scholarship
- **Coursework:** Computer Vision, Motion Planning, Reinforcement Learning, Hands-On Autonomous Aerial Robotics

Visvesvaraya National Institute of Technology **Aug 2018 - May 2022**
Bachelor of Technology, Electronics and Communication Engineering (GPA: 8.26/10) *Nagpur, India*

TECHNICAL SKILLS

- **Programming Languages:** Python, C, C++, Verilog, VHDL, Assembly
- **Robotics & Middleware:** ROS2, OMPL, IssacSim
- **Machine Learning & Computer Vision:** PyTorch, TensorFlow, SciKit-Learn, OpenCV, Numpy, Pandas, Matplotlib
- **Simulation & Modeling:** MATLAB/Simulink, Fusion 360, Multisim, Proteus, Modelsim
- **Tools & Technologies:** LaTeX, LabVIEW, VPP, DPDK
- **Hardware:** Jetson Orin Nano, Arduino Uno, ESP32, Raspberry Pi, pix32 v6 Flight Controller, Soldering, Circuit prototyping

WORK EXPERIENCE

PeAR Lab, WPI | *Graduate Researcher* **Jul 2025 - Present**
- Engineered a full sim-to-real pipeline for autonomous drone navigation in zero-light conditions using Python, leveraging structured lighting and coded aperture for dense depth estimation with DenseNet-121, achieving real-time performance (15+ FPS) on Jetson Orin Nano and enabling robust navigation in GPS-denied, light-absent environments.

Jio Platforms Limited | *5G Software Engineer R&D* **Jun 2022 - May 2024**
- Modified VPP source code in C to dynamically store User Plane Function (UPF) statistics in shared memory, enhancing real-time monitoring and streamlining the debugging process for VPP crashes during network testing.
- Rewrote UPF functionalities in C++ with a focus on clean, maintainable code and comprehensive unit tests, ensuring compatibility with the upgraded VPP version and improving overall system performance and reliability.

PUBLICATIONS

- S. Khobragade, D. Singh, N. J. Sanket.AsterNav: Autonomous Aerial Robot Navigation in Darkness Using Passive Computation.*(2026). IEEE Robotics and Automation Letters (RA-L), Early Access*
- S.Khobragade, A. Kinage, D. Shambharkar.Real-time Track and Anomaly Detection in Complex Railway Environment.- *(2022). 2022 1st International Conference Paradigm Shifts in Communication, Embedded Systems, Machine Learning and Signal Processing (PCEMS)*

ACADEMIC PROJECT

Einstein Vision: Advanced Visualizations for Self-Driving Cars | Github **Jan 2025 - May 2025**
- Designed dashboard visualizations for autonomous driving, integrating deep learning models (Mask R-CNN, YOLO, Detic, Depth Anything V2, RAFT) to detect and track lanes, vehicles, pedestrians, and traffic signals.
- Rendered high-fidelity videos across 13 driving sequences, reducing detection ambiguities by 15–20% with hybrid deep learning and classical heuristics for robust scene understanding.

Deep Visual-Inertial Odometry | Github **Jan 2025 - May 2025**
- Modeled a VIO pipeline combining CNN-based visual feature extraction with LSTM-based IMU fusion, improving pose estimation accuracy through joint optimization with Mean Squared Error and Geodesic loss.
- Generated synthetic training data in Blender across 25 trajectory types and 3 noise profiles, achieving a 28% reduction in RMSE of absolute trajectory error compared to baseline methods.

Optimizing Mixed-Autonomy Traffic Using Reinforcement Learning **Oct 2024 - Dec 2024**
- Developed a reinforcement learning model using Proximal Policy Optimization (PPO) to improve traffic flow and fairness in lane-merging scenarios with both autonomous and human-driven vehicles.
- Utilized Flow and SUMO for simulation, integrating fairness penalties in the reward function to balance efficiency and equity. Achieved significant improvements in metrics such as average speed, throughput efficiency, and fairness across various bottleneck scenarios.

Real-Time Motion Planning for Drones in Unknown Environments **Oct 2024 - Dec 2024**
- Developed a real-time motion planning framework integrating OctoMap for global 3D mapping and EDT3D for precise local collision detection.
- Designed a kinodynamic RRT-based planner to generate safe, efficient trajectories while accounting for vehicle dynamics and obstacle avoidance. Validated the framework in simulated environments, achieving robust, collision-free navigation in complex and cluttered scenarios.