

Neeraj Kumar Kanchani

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SUMMARY

Robotics software engineer building tested Python and C++ systems for distributed edge devices, real-time perception, state estimation, and bounded control in ROS 2 and Gazebo.

TECHNICAL SKILLS

Languages: Python, C++, C, MATLAB

Robotics: ROS 2 Jazzy, Gazebo Harmonic, state estimation, EKF, control systems, multi-robot systems

Perception: YOLOv8, OpenCV, monocular geometry, computer vision

Systems: Linux, Docker, distributed architectures, GitHub Actions, CI/CD, unit and integration testing

TECHNICAL PROJECTS

Vision-Only Leader-Follower Warehouse Coordination

github.com/justneeraj12/ee616-vision-leader-follower

ROS 2 Jazzy, Gazebo Harmonic, Python, YOLOv8n, OpenCV, EKF, Docker

- Validated string stability across 12 three-follower chain runs and 18 visual-blackout and yaw-bias disturbance runs, measuring 0.1004 m, 0.0739 m, and 0.0523 m worst-case RMSE with zero collisions.
- Designed a deterministic TRACK, PREDICT, and SAFE STOP supervisor combining monocular pinhole geometry, wheel odometry, and bounded range-and-bearing control.
- Architected a containerized ROS 2 Jazzy and Gazebo Harmonic multi-robot convoy across isolated namespaces with 5 ROS packages and 61 passing unit and integration tests.
- Profiled execution on an RTX 3050 Ti with 4 GB VRAM, achieving 23.09 ms p95 camera-to-measurement latency, 48.35 ms p95 measurement-to-control latency, 642 MiB peak VRAM, and 0.9996 minimum real-time factor.
- Diagnosed RGB/BGR tensor channel mismatches and stale-frame timestamps in a YOLOv8n pipeline, reaching 100% valid detections with 0.0323 m range RMSE, 0.1569 degree bearing MAE, and 9.02 ms p95 inference latency.

CPU-First Local Face Authentication for Linux

github.com/justneeraj12/face-unlock-linux

C++17, C, PAM, Qt 6, OpenCV DNN, V4L2, UNIX sockets, libsodium, CMake

- Built a CPU-only ONNX pipeline with YuNet 5-landmark detection and SFace 112x112 alignment and embeddings, measuring 6.6 ms detection and 10.1 ms p50 / 12.6 ms p95 embedding latency without CUDA.

Nocturne Operations Console for Hyprland

github.com/justneeraj12/nocturne-hyprland

C++, Qt 6, Qt Quick, LayerShellQt, Wayland, DBus, Linux IPC

- Built deterministic recovery and upgrade verification with preflight snapshots, read-only diagnostics, and confirmation-gated rollback tested in clean Ubuntu and Arch CI containers.

EXPERIENCE

Graduate Research Assistant, Theoretical Systems

Sep 2025 - Jan 2026

Clarkson University, Dr. Banavar's Research Group | Potsdam, NY

- Benchmarked Gauss-Newton solvers against linearized least squares for nonlinear time-of-arrival localization, quantifying 6.8 m RMSE for linear approximations.
- Simulated discovery in a 200-node wireless network, reducing RSSI localization error by 50% through anchor placement and GDOP-based analysis.

Student Intern, Drone Technology

Feb 2023 - Jun 2023

Avian Aerospace | Bengaluru, India

- Calibrated ArduPilot flight controllers across 4 drone prototypes, reducing mid-flight telemetry errors by 12% through PID tuning and flight-log analysis.

Undergraduate Research Assistant, UAVs and Robotics

Jan 2023 - Jun 2024

Cambridge Institute of Technology, Dr. Antony's Lab | Bengaluru, India

- Built 2 UAV and UUV prototypes by integrating perception, embedded control, and field-testing workflows, achieving 92% autonomous obstacle-avoidance success in real-world trials.
- Optimized onboard OpenCV perception, reducing aerial tracking latency by 30 ms for real-time navigation.

EDUCATION

Clarkson University

Potsdam, NY

M.S. in Electrical and Computer Engineering | Expected December 2026

GPA: 3.5/4.0; coursework in signal processing, machine learning, control systems, and robotics

Visvesvaraya Technological University

Bengaluru, India

B.E. in Artificial Intelligence and Machine Learning | July 2025

GPA: 7.09/10.0; First Class with Distinction

UNDERGRADUATE LEADERSHIP

Cambridge Institute of Technology

Bengaluru, India

Chair, IEEE Robotics and Automation Society College Chapter; President, College Robotics Club