RONISH NADAR

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SUMMARY

Robotics / embedded engineer (NYU M.S. Mechatronics and Robotics) building autonomous systems across perception, planning, and control. Experienced with ROS 2, microcontrollers, sensor fusion, and real-time integration for robotics deployments.

SKILLS

Languages: C, C++, Python, MATLAB
Robotics: ROS 2, SLAM, A*/RRT*, Nav stacks, Pure Pursuit, PID/LQR/MPC, System Identification
Perception/AI: OpenCV, YOLO, ArUco/AprilTag, VLM/LLM integration, PyTorch
Embedded: STM32/ESP32/RPi/Jetson; UART/I^{2}C/SPI/CAN/RS485; Wi-Fi/BLE/LoRa; PCB (Altium/KiCad/Eagle)

EXPERIENCE

Graduate Research Assistant — NYU Mechatronics, Controls & Robotics Lab (Dr. Vikram Kapila) **Jun 2025 – Present**
Embodied AI for multi-robot autonomy (LLM/VLM + planning + control) *New York, NY*

- Built a natural-language-to-actions robotics pipeline (LLM/VLM) for multi-robot task execution and coordination.
- Implemented navigation + control stack (RRT* + tracking controller) enabling collision-aware motion and precise docking.
- Engineered real-time comms to ESP32 bridge (RPC + Wi-Fi/BLE/ESP-NOW) for low-latency command streaming.

Graduate Teaching Assistant — NYU Tandon, MAE Department
New York, NY

Automatic Controls Laboratory **Jan 2026 – Present**

- Redesigned the lab curriculum by developing Arduino-based experiments that teach real-time control implementation on microcontrollers.
- Instructed students on ADC/DAC/PWM, sensors/actuators, system identification, and controller design/implementation (loop-shaping, PID, LQR).

ROB-GY 5103 Mechatronics **Sep 2025 – Dec 2025**

- Led weekly lab support for embedded bring-up, sensors/actuators, DC motor control, and debugging workflows.
- Supported instruction on feedback control and discrete-time concepts; assisted grading and evaluations.

Embedded Systems Engineer — Utopia Tech **Jul 2023 – Jul 2024**
Mumbai, India

- Shipped production firmware + PCB updates for IoT energy monitoring devices deployed at 10,000+ unit scale; reduced downtime by ~17%.
- Built automated factory test jigs + Python tooling, cutting validation cycle from 14 days to 3 days (4.6× throughput).
- Delivered STM32/ESP32 firmware in C/C++; integrated communication stacks and HMI for configuration and diagnostics.

PROJECTS

Ackermann Drive Simulation + Control (Hybrid A* / SMC) **Sep 2025 – Dec 2025**

- Modeled double-track Ackermann dynamics and implemented a robust tracking controller for curvature-constrained paths.
- Validated planning + control in obstacle scenarios; enforced steering/torque constraints at 100 Hz.

Mapping Robot: SONAR Point Cloud + ROS 2 Visualization **Sep 2024 – Dec 2024**

- Built an ESP32 Micro-ROS pipeline streaming sensor data to ROS 2 at 20—50 Hz; visualized maps as point clouds.
- Implemented IMU and encoder fusion for pose estimation and optimized pub/sub latency by 30%.

Motion-Control Rehabilitation Game (ESP32 + OpenCV + IMU) **Jan 2025 – May 2025**

- Combined OpenCV tracking and IMU sensing to detect gestures and score motion exercises in real time.
- Built a low-latency ESP-NOW link and Python runtime for rendering and logging.

EDUCATION

New York University, Tandon School of Engineering **2024 – 2026**
M.S. Mechatronics & Robotics (GPA: 3.917) *New York, NY*

University of Mumbai **2019 – 2023**
B.E. Electronics & Telecommunications (GPA: 3.8) *Mumbai, India*