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, firmware, 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^2C/SPI/CAN/RS485; Wi-Fi/BLE/LoRa; PCB (Altium/KiCad/Eagle)

EXPERIENCE

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

- Developed zero-code **LLM/VLM** pipeline with **GUI** for high-level reasoning and task execution (pick/place, sorting).
- Delivered full autonomy stack: **multi-camera** perception → **RRT*** (online replanning) → **Pure Pursuit/PID** for precision docking.
- Deployed **ZeroMQ/CBOR RPC** layer with multi-comm bridge (**Wi-Fi/BLE/ESP-NOW**) for low-latency robot coordination.

Graduate Teaching Assistant — NYU Tandon, MAE Department **Sep 2025 – Present**
Automatic Controls & Mechatronics Laboratories *New York, NY*

- Redesigned **Automatic Controls** curriculum; developed **Arduino** experiments for real-time **PID/LQR** and **system ID**.
- Lead **Mechatronics** lab support for **embedded bring-up**, **sensors/actuators**, and **discrete-time** feedback control.

Embedded Systems Engineer — Utopia Tech (EazyIot) **Jul 2023 – Jul 2024**
IoT Energy Monitoring Systems *Mumbai, India*

- Designed **PCB** and shipped production **C/C++ firmware** for **10,000+ units**; reduced device downtime by **~17%**.
- Built automated factory test jigs, cutting validation cycle from **14 days** to **3 days** (**4.6**× throughput).
- Developed **STM32/ESP32** communication stacks and **HMI** for field configuration and diagnostics.

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*

PROJECTS

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

- Modeled **double-track Ackermann dynamics** and implemented **SMC** tracking for **curvature-constrained** paths; reduced tracking error by **35%** compared to baseline PID.
- Validated **Hybrid A*** planning + closed-loop tracking in **obstacle** scenarios; improved success rate by **40%** while enforcing 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 **50 Hz**; increased map update stability by **45%** and visualized **point clouds** in **RViz**
- Implemented **IMU + encoder fusion** for **pose estimation** and reduced **pub/sub latency** by **25%**.

TATA Power: 110 kV Insulator Cleaning Robot **Aug 2022 – Jan 2023**

- Developed a **4-DoF SCARA manipulator** for **110 kV** environments; implemented **IK** and **motion planning** achieving **±8 mm** trajectory precision for automated cleaning.
- Architected **EMI-hardened hardware** using **optocouplers**, **Faraday shielding**, and **custom PCBs** that reduced diagnostic downtime by **50%** via a **distributed firmware** architecture.
- Integrated **IR thermography** for **hotspot detection** and **OpenCV** for **line-following**; reduced inspection time by **3**× and improved cleaning consistency by **65%**.