

# PRABAL KHARE

## M.S. MECHATRONICS AND ROBOTICS | NYU TANDON SCHOOL OF ENGINEERING

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### PROFILE

First year M.S. student in Mechatronics and Robotics at NYU Tandon with experience in ROS 2 robotics software, laboratory hardware and engineering team operations. Managed a \$15K+ budget, inventory and procurement for a 120 member robotics team, led technical workshops for more than 150 attendees and completed 300 navigation and docking validation trials on an industrial autonomous mobile robot.

### EDUCATION

#### New York University, Tandon School of Engineering

Expected May 2028

Master of Science in Mechatronics and Robotics | Brooklyn, New York

First year graduate student, Fall 2026

#### Vellore Institute of Technology Chennai

July 2026

Bachelor of Technology in Computer Engineering, Robotics and AI Specialization | Chennai, India

### RELEVANT EXPERIENCE

#### Robotics Software Intern | Next Robotics Lab Co., Ltd.

January 2026 to July 2026

Pathum Thani, Thailand

- Built a reusable ROS 2 autonomy stack for the 300 kg SMR300 autonomous mobile robot, integrating LiDAR, PGV, Nav2, an AI camera, CANopen and CiA 402 while replacing the company's prior ROS 1 architecture.
- Ran 150 shelf docking trials and 150 point to point runs. The system achieved 97% docking success, 2 cm shelf docking error and a 3 cm mean point to point mismatch, down from 5 cm.
- Implemented LiDAR based reflective marker recognition for two and four legged shelves with center checks, automatic repositioning, sector safety controls, safe aborts and alerts. Traced a recurring failure to sunlight reflections at open factory doors.
- Built operator tools for mapping, map editing, URDF and sensor configuration, Nav2 parameters, mission control, monitoring and deployment checks. Five operators and two engineers evaluated the Node-RED dashboard.

#### Resource Head and Systems Department Member | Dreadnought Robotics

August 2023 to June 2025

Chennai, India | Resource Head, August 2024 to June 2025 | Systems Department Member, August 2023 to August 2024

- Managed a \$15K+ budget, inventory and procurement for 120 members across four departments, comparing alternatives for cost, availability and system fit.
- Coordinated cross functional hardware and software testing, troubleshooting and subsystem integration for Project MIRA, an autonomous underwater vehicle.
- Designed electrical systems for operation inside a sealed AUV hull and developed ROS, MAVROS and MAVLink control software. The team placed second at TAC Challenge Norway 2024.

### ADDITIONAL ENGINEERING EXPERIENCE

#### Hardware Engineering Intern | Theta Sound

January 2025 to October 2025

Remote

- Produced PCB layouts and simulated prototypes for Qualcomm based smart earphones, evaluating ANC, Bluetooth, microphones, battery systems, PPG and IMU sensing.
- Modeled board footprint, battery life and power consumption to guide an early prototype; led a KiCad PCB design workshop for 50 attendees.

#### AI Software Development Intern | Drone Entry

June 2025 to August 2025

Thailand

- Built OpenDroneKit, a PyQt6 structural inspection workflow spanning approximately 40,000 metal, brick and other defect images, with YOLOv8 detection and U-Net crack segmentation.
- Mapped detected cracks onto COLMAP 3D reconstructions and connected segmentation masks to FEniCSx simulations to estimate crack propagation and flag potential structural severity.
- Implemented desktop workflows for project setup, dataset import, defect analysis, reconstruction and report generation.

#### R&D Summer Intern, Robotics and Drones | Drone Academy

May 2025 to June 2025

Thailand

- Designed and fabricated three PCBs for an animatronic head, Raspberry Pi 4 I/O and an RC car kit, controlling eye, jaw and head servos plus a speaker through GPIO.
- Ran text to speech and a 2B parameter language model locally on an 8 GB Raspberry Pi 4; validated the RC car board for sale as a build your own educational product.

## SELECTED PROJECTS

### Kurat, Autonomous Conversational Robot | ROS 2, PyTorch, YOLO, STT and TTS

2025 to Present

Independent project

- Designed a three brain architecture that separates perception, cognition and action for modular autonomy and reliable real time interaction.
- Integrated an Intel RealSense D435i and Jetson Orin Nano with YOLOv8, Whisper, ORB-SLAM3 and Nav2 for perception, speech, localization and navigation.

### Autonomous VTOL UAV, Search and Rescue | Python, MAVROS, Pixhawk and OpenCV

2023

Smart India Hackathon

- Placed in the top 30 of 500 teams at Smart India Hackathon 2023 with a VTOL search and rescue system using Raspberry Pi, Pixhawk, MAVROS, thermal imaging, TensorFlow Lite and YOLOv5 inference.
- Implemented dataset preparation, autonomous scan patterns and a custom battery management system.

## SKILLS

**Programming:** C++, Python, JavaScript and MATLAB

**Robotics and autonomy:** ROS 2, Nav2, SLAM, tf2, localization, path planning, robot bringup, AMRs, LiDAR, PGV, URDF, RViz, Gazebo, MAVROS and MAVLink

**Controls and embedded:** CANopen, CiA 402, PID control, sensor fusion, Raspberry Pi, Arduino, Pixhawk, motor drivers and PCB design

**Vision and tools:** OpenCV, YOLOv8, U-Net, PyTorch, TensorFlow, COLMAP, FEniCSx, PyQt6, Node-RED, Git, Docker, Linux and Web APIs

**Operations:** Budget management, procurement, inventory, workshop instruction, equipment testing, deployment validation and technical troubleshooting

**Languages:** English, Hindi, Thai, Marathi and German (basic)

## PATENTS AND INTELLECTUAL PROPERTY

### Transformation Drone, Autonomous Drone-Rover System | Patent filing

Filed | 202641035669

- Designed a hybrid UAV and UGV with a deployable micro drone plus visual and thermal detection for search and rescue in GPS denied environments.

### Thermoregulation System for Portable Water Containers | Patent filing

Filed | Number pending

- Designed a Peltier based heating and cooling system with heat dissipation, battery management and app enabled remote control.

### IMU Calibration and Sensor Fusion Module | Patent filing

Filed | Number pending

- Developed bias, scale factor and misalignment calibration with complementary and EKF based fusion for stable attitude estimation under vibration.

## HONORS AND WORKSHOPS

**Competitions:** TAC Challenge Norway 2024, 2nd place | Smart India Hackathon 2024, top 5 of 400 | Smart India Hackathon 2023, top 30 of 500

**Workshops:** Led a KiCad PCB design workshop for 50 attendees | Led a machine learning workshop for more than 100 students

**Other honors:** GEOFEST CMU 2020, 2nd place | International Poem Writing Competition, 1st place | Indo-Thai Quiz Competition, 1st place