PRABAL KHARE

ROBOTICS SOFTWARE ENGINEER | ROBOTICS ENGINEER | AUTONOMY ENGINEER

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EDUCATION

New York University, Tandon School of Engineering | Brooklyn, NY **Expected May 2028**
Master of Science in Mechatronics and Robotics

Vellore Institute of Technology Chennai | Chennai, India **Jul 2026**
B.Tech in Computer Engineering, Robotics and AI Specialization

TECHNICAL SKILLS

Programming: Python, C++, JavaScript, MATLAB
Robotics and Autonomy: ROS 2, Nav2, SLAM, tf2, localization, path planning, robot bringup, AMRs, LiDAR, PGV, URDF, RViz, Gazebo, MAVROS, MAVLink
Controls and Embedded: CANopen, CiA 402, PID control, sensor fusion, Raspberry Pi, Arduino, Pixhawk, motor drivers, PCB design
Vision and Tools: OpenCV, YOLOv8, U-Net, PyTorch, TensorFlow, COLMAP, FEniCSx, PyQt6, Node-RED, Git, Docker, Linux, Web APIs
Spoken Languages: English, Hindi, Thai, Marathi, German (Basic)

EXPERIENCE

Robotics Software Intern | *Next Robotics Lab Co., Ltd.* | Pathum Thani, Thailand | **GitHub** **Jan 2026 - Jul 2026**

- Architected a reusable ROS 2 autonomy stack for the 300 kg SMR300 AMR, integrating LiDAR, PGV, Nav2, an AI camera, CANopen and CiA 402 while replacing the company's prior ROS 1 architecture.
- Validated navigation through 150 shelf docking trials and 150 point-to-point runs, achieving 97% docking success and 2 cm shelf docking error while reducing point-to-point mismatch from 5 cm to a 3 cm mean.
- Implemented reflective-marker recognition for two- and four-legged shelves using LiDAR clustering, center checks, automatic repositioning, sector safety gating, safe aborts and alerts; diagnosed failures caused by sunlight reflections at open factory doors.
- Built an operator platform for mapping, map editing, URDF and sensor configuration, Nav2 parameters, mission control, monitoring and deployment validation, plus a Node-RED dashboard evaluated by 5 operators and 2 engineers.
- Developed Python, C++, JavaScript and Web API components for path following, zone management, map handling, robot profiles, workflow management and robot bringup.

Hardware Engineering Intern | *Theta Sound* | Remote **Jan 2025 - Oct 2025**

- Researched smart-earphone architectures and produced multiple PCB layouts and simulated prototypes, evaluating Qualcomm audio platforms, ANC, Bluetooth, microphones, battery systems, PPG and IMU health sensing and sensor fusion.
- Modeled board footprint, battery life and power consumption to guide an early prototype for engineers and manufacturers; led a KiCad PCB design workshop for 50 attendees.

AI Software Development Intern | *Drone Entry* | Thailand | **GitHub** **Jun 2025 - Aug 2025**

- Built OpenDroneKit, a PyQt6 structural-inspection workflow spanning approximately 40,000 metal, brick and other defect images, integrating 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 over time and flag potential structural severity.
- Implemented desktop workflows for project setup, dataset import, defect analysis, reconstruction and report generation.

EXPERIENCE CONTINUED

R&D Summer Intern, Robotics and Drones | *Drone Academy* | Thailand **May 2025 - Jun 2025**

- Designed and fabricated 3 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.

Dreadnought Robotics | Chennai, India | **Project MIRA** **Aug 2023 - Jun 2025**

Resource Head, Aug 2024 - Jun 2025 | Systems Department Member, Aug 2023 - Aug 2024

- Managed a $15K+ budget, inventory and procurement decisions for 120 members across 4 departments, comparing alternatives for cost, availability and system fit.
- For Project MIRA, designed electrical systems for reliable operation within a sealed AUV hull and developed ROS, MAVROS and MAVLink control software, contributing to 2nd place at TAC Challenge Norway 2024.
- Integrated power distribution, hydrophones and sensor-control subsystems while coordinating cross-functional testing and troubleshooting across hardware and software teams.

PROJECTS

Kurat, Autonomous Conversational Robot | *ROS 2, PyTorch, YOLO, STT/TTS* **2025 - Present**

- Designed a three-brain architecture separating perception, cognition and action to support 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 interaction, localization and navigation.

Autonomous VTOL UAV, Search and Rescue | *Python, MAVROS, Pixhawk, OpenCV* | **GitHub** **2023**

- Placed Top 30 of 500 teams at Smart India Hackathon 2023 by building a VTOL search-and-rescue system with Raspberry Pi, Pixhawk, MAVROS, OpenCV and thermal imaging for victim detection.
- Implemented dataset preparation, TensorFlow Lite and YOLOv5 inference, autonomous scan patterns and a custom battery management system.

PATENTS AND INTELLECTUAL PROPERTY

Transformation Drone, Autonomous Drone-Rover System **Filed | 202641035669**

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

Thermoregulation System for Portable Water Containers **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 **Filed | Number Pending**

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

HONORS AND LEADERSHIP

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 KiCad PCB Design Workshop for 50 attendees | Led Machine Learning Workshop for 100+ students

Additional Honors: GEOFEST CMU 2020, 2nd Place | International Poem Writing Competition, 1st Place | Indo-Thai Quiz Competition, 1st Place