HRIDIK KAJARIA

Robotics Engineer | Production & Operations Leader | Singapore
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PROFESSIONAL SUMMARY

Results-driven Robotics Engineer and Operations Leader with an MSc from the National University of Singapore and 3+ years of end-to-end experience scaling autonomous robotic systems from prototype to global production. Proven track record managing cross-functional engineering teams of up to 9 people across multiple countries and executing hardware and software deployments across 15+ countries on 5 continents. Deep expertise in ROS/ROS2, mechanical design, sensor fusion, and Design for Manufacturability (DfM), combined with strong stakeholder management, root-cause analysis, and fleet operations capabilities. Seeking a senior leadership role where technical depth and operational ownership intersect.

LEADERSHIP & IMPACT HIGHLIGHTS

15+	9-Person	5	100%
Countries Deployed	Cross-Functional Team	Continents Covered	Quality Compliance

PROFESSIONAL EXPERIENCE

Production & Operations Lead | **Alicia Bots** | Singapore *Jan 2025 – Present*

- Directed end-to-end production operations and implemented digital hardware version control (BOMs/ECNs), achieving 100% adherence to global quality compliance standards and eliminating assembly bottlenecks across the production pipeline.
- Led and managed a cross-functional team of 9 engineers across Singapore and Greece, coordinating hardware, software, and operations functions to streamline global delivery and post-sales support.
- Executed mission-critical hardware and software system upgrades for deployed robot fleets across 15+ countries and 5 continents, ensuring peak performance in diverse operational and environmental conditions.
- Developed a systemic Preventive Maintenance (PM) framework for high-precision robotic subsystems, leveraging real-time sensor telemetry to reduce equipment downtime and extend fleet operational lifespan.
- Led cross-functional root-cause analysis investigations into complex electromechanical failures, driving permanent design corrections and executing fleet-wide hardware upgrades across international deployments.
- Served as primary technical point of contact for international clients across multiple regions, conducting live system demonstrations and translating client feedback into actionable R&D design requirements.

Robotics Engineer | **Alicia Bots** | Singapore *Apr 2024 – Jan 2025*

- Spearheaded mechanical design of hardware enclosures for autonomous systems, balancing thermal management with modular architecture to enable rapid client deployment and consistent performance stability.
- Directed the Design-to-Manufacturing (D2M) transfer by optimising complex 3D CAD models for cost and scalability, ensuring seamless transition from prototype to high-volume production.
- Led full-stack ROS to ROS2 migration in C++ and Python, re-engineering hardware drivers, communication protocols, and sensor interfaces for embedded electronics and microcontrollers.
- Implemented sensor-fusion-based tracking using optical encoders, depth sensors, and IMU to track magnetic crawling robots in GPS-denied underwater environments at depths up to 30m.
- Liaised with external sheet-metal and plastic part manufacturers to refine mechanical designs, resolving structural integrity and hydrothermal resilience issues for consumer-deployed systems.
- Directed development of a comprehensive UI/UX application enabling end users to visualise robotic parameters, spatial mapping, and live diagnostic feedback in a unified interface.

Hardware Engineer Intern | **Fabrica AI** | Singapore *Jun 2023 – Aug 2023*

- Developed complex CAD architectures and high-precision assembly layouts for robotic systems, ensuring seamless integration between hardware components and automated workflows.

- Established standard mechanical design practices including tolerance guidelines and assembly tool access specifications, increasing part integrity and reducing assembly downtime by 30%.
- Managed in-house production of 3D-printed parts and submodules, optimising equipment uptime and accelerating the rapid prototyping cycle for new mechatronic features.

Graduate Research Assistant | **National University of Singapore** | Singapore *Aug 2022 – May 2023*

- Collaborated with Prof. G.S. Chirikjian to develop mathematical frameworks for semantic object classification, utilising PyBullet to simulate physical interactions and validate functional affordances.
- Designed and implemented a custom Python software stack for multi-axis stability evaluation, leveraging spatial reasoning algorithms to enhance robotic interaction and object handling.
- Performed Sim-to-Real validation via physical simulation in PyBullet, testing functional table poses from stable configurations to replicate real-world scenarios.

CORE TECHNICAL COMPETENCIES

Robotics Software	ROS, ROS2, C++, Python, OpenCV, PyBullet, Gazebo, SLAM, Autonomous Navigation, Reinforcement Learning, RViz
Mechanical Design	SolidWorks, Fusion 360, SolidEdge, ANSYS, FEA, Generative Design, GD&T, DfM, DfA, 3D Printing, CNC, Waterjet, Laser Cutting
Systems & Hardware	Sensor Fusion, IMU, Optical Encoders, Depth Sensors, Embedded Electronics, Microcontrollers, Communication Protocols, Linux, Bash, Git
Operations	Product Lifecycle Management (PLM), Fleet Management, Preventive Maintenance, Root Cause Analysis, Quality Control, BOM/ECN Management, Process Optimisation
Leadership	Cross-Functional Team Management, Stakeholder Management, International Client Relations, Project Management, Engineering Project Delivery

EDUCATION

M.Sc. Mechanical Engineering | **National University of Singapore (NUS)** | Singapore
Aug 2022 – Jul 2023
Specialisation: Robotics, Autonomous Systems & Neural Networks, Soft Robotics, Advanced Manufacturing

B.Tech. Mechanical Engineering | **Vellore Institute of Technology (VIT)** | India
Jul 2018 – May 2022
Specialisation: Mechatronics System Design and Computational Multi-Body Design

PUBLICATIONS

Lead Author: "Development of an Autonomous Disinfection Robot Capable of Last Mile Delivery" — integration of navigation stacks and mechanical durability for urban environments (2023).
Co-Author: "Optimisation of Prosthetic Leg using Generative Design and Compliant Mechanism" — AI-driven design and flexible structures to improve hardware performance and mobility (2021).

NOTABLE PROJECTS & ACHIEVEMENTS

- Designed and fabricated 60kg and 15kg combat robots end-to-end using CNC, waterjet, and laser manufacturing — secured 1st Place and 2nd Place at national and international competitions.
- Led structural re-engineering of a commercial treadmill into a Gait Rehabilitation System using hollow-beam architecture and a six-bar linkage mechanism for enhanced mechanical precision and user safety.
- Designed SLAM and autonomous navigation software for a mobile robot in a Gazebo warehouse simulation, integrating mapping and path-planning for structured indoor environments.
- Engineered an autonomous navigation agent using Q-Learning and Epsilon-Greedy policies, optimising reward-based pathfinding and decision-making in structured grid-world environments.