JAYANT RATHI

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Education

Master of Science in Robotics, Northeastern University — **Boston, MA (expected Dec 2026)**

- Courses include Robotic Sensing and Navigation, Robotic Mechanics and Control, Control Systems Engineering, Reinforcement Learning and Sequential Decision Making

Bachelor of Science in Mechatronics Engineering, Assumption University — **Bangkok, Thailand (Graduated Oct 2023)**

- Awarded Rector's Certificate of Honors for High GPA (above 3.85) for 2 consecutive years
- Researched at the **Intelligent Systems Laboratory (ISL)** working on "Smart Sensors" projects focused on vision & audio-based AI
- President of the Debate Club (2019-2023) - Training juniors while competing in and hosting multiple country-wide tournaments

Publication

- Authored and showcased at international conference (EECON 46), a published research (IEET) paper on "AI in Home Security" focusing on the implementation and research behind my Senior Project, representing the ABAC engineering faculty as the only student in the Industry AI focus category

Technical Skills

- **Programming & Tools:** Python, C, C++, SQL, VHDL, Verilog, Linux, Docker, Git/GitLab, Conda, Jupyter, VS Code, AWS, Firebase
- **Robotics, Control & Embedded Systems:** ROS2 (Nav2, SLAM, TF2), Kinematics, Dynamics & Control (PID/LQR), State Estimation, Mapping & Localization, Sensor Calibration, Autonomous Navigation, Microcontrollers (ESP32s, MCUs), UART/I2C/SPI, PCB-level Circuit Design, Sensors & Actuators, IoT System Integration
- **AI & ML:** PyTorch, TensorFlow/Keras, Reinforcement Learning Algorithms, CNNs, Feature Engineering, Audio Classification, Computer Vision, Model Deployment
- **Simulation & Engineering Tools:** MATLAB/Simulink, SolidWorks, AutoCAD, PowerBI, 3D CAD Engineering Design

Work Experience

Process Engineering Intern, Mercedes-Benz Thailand — **Bangkok, Thailand (Apr 2023 - Sep 2023)**

- Built ML Based part-replacement prediction pipeline (Python, Java, VBA), increasing recommendation accuracy and reducing manual verification and data validation time across SE Asia operations
- Developed automated shipping-tracking and data validation tools for multiple team members, eliminating manual workflows and improving part traceability across multiple departments
- Served as a technical troubleshooter across plant-wide engineering initiatives, resolving system failures and data pipeline bottlenecks, helping maintain continuous operation and reliability throughout the plant
- Created real time PowerBI dashboards to improve logistics KPI visibility and help accelerate decision making for operation leadership

AI Development Intern, Baksters Computer Vision (AI Research Startup Firm) — **Bangkok, Thailand (Sep 2021 - Jan 2022)**

- Built a sound-based home security system as part of a core developer team (2-members) using Machine Learning models, working from the ground up from data recording and collection to final running and demo showcase to prospective clients
- Conducted research on programming of sound and WIFI-based AI prediction models in Python that detected hazardous events (through sound and movement e.g., fires, drops, screams, etc.) using Keras and TensorFlow libraries achieving 97% accuracy
- Led technical demos and client presentations for major SE Asian telecom clients including True Corp. and Advanced Info Service

CEO Office Intern, Varun Beverages Sri Lanka (Pepsi's largest bottler in Asia) — **Colombo, Sri Lanka (Jan 2018 - Mar 2018)**

- Placed directly in the CEO's office with exposure to various functions e.g. participated in brainstorming and executing marketing campaigns, distribution systems tasks during on-field visits to retail locations, and accounting practices at HQ
- Learned about production processes, quality control and R&D aspects of soda production at Asia's largest PepsiCo bottling plant
- Participated in strategic business and production strategy discussions among the C-suite as well as daily tactical problem solving

Key Projects

Reinforcement Learning Algorithms for Atari & Custom Game Environments — **Boston, MA (2025)**

- Developed and trained 10 custom deep reinforcement learning agents (PPO-Dueling-DQN, Quantile DQN, and Attention-DQN, etc.) across Atari games and a custom-built Cubefield game environment in order to benchmark performance and decision making.
- Self-taught RL Concepts (e.g., policy gradients, actor-critic methods, quantile regression) and libraries such as PyTorch, Gym, and NumPy for agent design, model development and testing

Environmental Mapping for Autonomous Vehicle — **Boston, MA (2024)**

- Integrated LeGO-LOAM with ROS2 to build a real time 3D mapping and odometry pipeline using VLP-16 LiDAR + IMU + GPS
- Executed multiple closed-loop campus runs, achieving stable feature-based maps suitable for autonomous navigation workflows
- Tuned extrinsics, motion compensation parameters and fusion settings for robust outdoor odometry

AI Home Security Robot, Senior Project — **Bangkok, Thailand (2023)**

- Built a multimodal home security robot integrating facial recognition, danger sound detection, motion detection, and GPS based navigation (ROS) as well as line tracking movement
- Deploying 3 real-time AI pipelines onboard and connected them to a Firebase cloud alert systems with instant notifications to homeowners through LINE
- Implemented robotics logic and AI modules using Python (AI models), Java and MATLAB (SLAM, obstacle detection, simulation)

Smart Farm cloud-based mobile application — **Bangkok, Thailand (2022)**

- Created a mobile application to remotely control a farm's irrigation and fertilizer systems with a user interface made of Android studio/Blynk (to control the systems) connected to a hardware ESP32 via a cloud-based server on Firebase and showcased through Node-Red while simulating underlying hardware components using MATLAB (SIMULINK), ESP32 and PLC Programming