

# Maaz Ahmad

AI/ML Software Engineer — MASc Mechatronics (University of Waterloo)

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## EXPERIENCE

### AI & Robotics Software Engineer

Sept. 2025 – Present

[Cobionix Corporation](#)

Kitchener, Canada

- AI algorithm development for computer vision pipeline on NVIDIA Jetson Orin (ONNX) for real-time perception.
- Optimizing TensorRT models with quantization and GPU/APU profiling to hit strict edge power-latency targets.
- Implementing firmware-style loops that monitor GPU/CPU load and adapt AI inference rates on-device.

### Research Assistant: Software Engineering

January. 2024 – July 2025

[Apple](#)

Waterloo, Canada

- Confidential project (NDA). Optimized SDR WiFi/OTA data paths in C++/Python on embedded Linux, cutting end-to-end latency.
- Profiled CPU, memory, and I/O to pinpoint bottlenecks and guide low-level code optimizations.
- Used Python/ML analysis on RF and telemetry logs to tune link parameters for stable throughput.
- Collaborated with RF, firmware, and embedded software teams to validate wireless performance over-the-air.

### Autonomy Software Graduate Research Student [Preprint: [Link](#), Video: [Link](#), Git: [Link](#)]

January. 2024 – September 2025

[UW ROBOHUB](#)

Waterloo, Canada

- Developed multi robot SLAM algorithm with 85% improvement vs baseline SOTA in C++/ROS2 on embedded Linux.
- Sensor fusion mmWave 4D radar with RGB-D in low-latency pipelines for perception and achieved 92% accuracy.
- Implemented TSDF-octree mapping in Docker on edge GPUs, tuning CPU/GPU load for real-time updates.
- Trained and deployed ML-NeRF and YOLO model on constrained GPUs, optimizing dataflow for real-time AI.
- Developed Python tooling to log SLAM accuracy/latency and used ML analysis to tune algorithms.

### Research Assistant: ML Software Engineering [Preprint: [Link](#), Git: [Link](#), Video: [Link](#)]

September. 2024 – December 2024

[KEYSIGHT TECHNOLOGIES](#)

Waterloo, Canada

- Developed software pipeline with OMPL library for 7-DoF COBOT - ML model for Motion planning algorithm.
- Deployed ML-augmented RRT planners via Python APIs with CI-friendly benchmarking across custom scenarios.
- Achieved 100% joint/collision avoidance constraints using auto-generated config launch trees.
- Validated deployment across sim-to-real environments with versioned motion plans and hardware-in-the-loop.

### Software Engineer | MITACS Research Internship

January. 2024 – August 2025

[ROGERS Communications Canada Inc](#)

Waterloo, Canada

- Integrated 5G with AI-SLAM on embedded Linux (Nvidia Jetson), used C++ stacks for latency and telemetry.
- Achieved 37% improvements, applied Python/ML models predict congestion and tune network parameters.
- Achieved real-time edge compute over 5G 28GHz channel and optimized the ML model using TensorRT.
- Containerized ROS2 services in Docker and added metrics hooks to drive data-informed optimization of pipelines.

### Asset Integrity Engineer II: Software

May 2022 – December 2023

[ABYSS Solutions Inc](#)

Isb (Onsite) & Australia

- Developed C++/Tensor flow CV pipelines for sonar and camera data to detect structural defects offshore rigs.
- Optimized batch inference and preprocessing to run large inspection jobs within tight memory and time budgets.
- Fused multi-sensor ROV/AUV data streams to improve anomaly detection robustness in low-visibility conditions.
- Led a 10-engineer team processing 18,000+ assets for BP Clair Ridge, achieving 91% high-quality digital inspection.

### Graduate Instrumentation and PLC Engineer

Sept 2021 – March 2022

[Fauji Cement Industry Co Ltd](#)

Wah Cantt (Onsite), Pak

- Familiarized with Siemens and ABB PLC industrial automation controls procedures. While working on plant rotation plan, observed troubleshooting, & calibrations of sensors i.e RTDs-Pyrometer, and load cells

EDUCATION

<b>University of Waterloo</b>   Thesis: AI/ML Autonomy <a href="#">Link 1</a> & Motion Planning <a href="#">Link 2</a> Masters of Applied Science (MASc), Mechatronics Engineering ( <b>CGPA: 93.5%</b> ) Courses: AI/ML Computational Intelligence   Autonomous Mobile Robots   Social Robotics   nanoBIOTECH Advisor(s): <a href="#">Dr. William Melek</a> ; <a href="#">Dr. George Shaker</a>	Waterloo, Canada Jan. 2024 – Aug. 2025
<b>Bahria University</b>   Thesis: AMRs AI/Swarm Robotics Autonomy <a href="#">Link</a> Bachelor of Science (BSc), Electrical Engineering and Computer Science ( <b>CGPA: A+</b> )	Isb, PK Sept. 2017 – Aug. 2021

SKILLS

**Languages:** C | C++ | Python | Bash | Object-Oriented Programming | Data Structures & Algorithms | Operating System (OS)  
**Embedded:** | API Embedded Linux (Jetson Orin, Ubuntu) | Low-latency edge compute | Real-time data pipelines | HW/SW integration | Microcontroller/SOC bring-up (sensors, cameras, networks) | Bare-metal/firmware C on MCUs | Power/performance tuning  
**AI/ML & Optimization:** TensorRT (CUDA)| PyTorch | TensorFlow | Scikit-learn | Model deployment on edge devices | Latency & throughput optimization | Quantization & pruning (edge AI) | Classical ML (KNN, SVM)  
**Control, Sensing & Autonomy:** Visual-Inertial SLAM | Sensor fusion (RGB-D, IMU, mmWave Radar) | Motion Planning (OMPL) | MPC | Multi-robot coordination  
**Tools & Build Systems:** Linux | Git | Docker | CMake | CI/CD (GitHub, GitLab) | ROS2 | Jupyter | Matplotlib

SIDE PROJECTS

- Humanoid Robotics: Non-Verbal Gesture** | *Project Report:* [Link](#)
- Integrated LLaMA 3 with gesture and vision sensing for real-time multimodal control of NAO robot, enabling non-verbal HRI via IMU-based motion interpretation
- Visual Feature Extraction using Machine Learning Models**
- Applied regression models (KNN, SVM) on complex image datasets to improve automated visual feature extraction, enhancing perception algorithms and robustness—key for camera data processing in autonomous systems.
- AMRs in Health Care** | *Project Video:* [Link](#)
- Designed an RFID-based autonomous nursing robot for pill dispensing and path-following in healthcare environments. Enabled simultaneous delivery of six types of medication and live video streaming.

ACHIEVEMENTS

- Best Performer Employee of the Month, Abyss Solutions Inc.
- Winner of 3 Hackathons on robotics and VR innovation at Abyss Solutions.
- Awarded full MASc Graduate funding award and recognized among top 3 undergraduate thesis projects.

PUBLICATIONS

- M. Qureshi et al.**, “CRADMap: Applied Distributed Volumetric Mapping with 5G-Connected Multi-Robots and 4D Radar Perception,” *ICARM 2025*. [\[arXiv\]](#)
- M. Qureshi et al.**, “RAPTAR: Radar Radiation Pattern Acquisition through Automated Collaborative Robotics,” *RA-L 2025 Robotics and Automation Letters Journal*. [\[arXiv\]](#)

ACADEMIC EXPERIENCE

<b>ICARM 2025 Conference Presentation</b> Conference Publication Presentation	Portsmouth, United Kingdom <b>2nd August, 2025</b>
<b>RoboHub Symposium Presentation</b> Presenter at RoboHub Symposium Research Presentation and Poster booth holder	Waterloo, Canada <b>17th Jan, 2025</b>
<b>Beyond Connectivity Summit Conference</b> Presenter at Rogers Technology Conference for Research work	Brampton, Canada <b>July, 2024</b>
<b>University of Waterloo</b> Teaching Assistant, MTE-203 Advanced Calculus — ME-360 Automatic Control Systems	Waterloo, Canada <b>May 2024 – Present</b>