

Mohammad Hameed

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AI / ML • Robotics & Autonomous Systems • Computer Vision • Full-Stack & Mobile • LLM Systems

SUMMARY

Senior software engineer with nine years of hands-on work in AI/ML, robotics, and autonomous systems. Built production computer vision, sensor fusion, and path planning software for UAVs and industrial robots, and now build LLM applications end to end: RAG pipelines, agentic workflows, evaluation harnesses, and the web and mobile products around them. MSc research introduced a multiresolution risk-map planner for beyond-visual-line-of-sight UAV routing. One management role at Wing (Alphabet) on FAA UTM certification; hands-on engineering for the other seven years.

SELECTED PROJECTS

Multiresolution UAV risk-map planner: layered sampling quadtree for 3D risk maps and a risk-aware A* variant for BVLOS routing, with an expected-fatality-rate bridge compatible with SORA. Python.

Video analysis engine: scene extraction, per-scene semantic tagging, and purpose-driven clip selection. Python, computer vision, LLMs.

ServiceMenu.io: AI-generated interactive service menus, quoting, and booking pages for local service businesses. Next.js, Supabase, Stripe, LLM generation pipeline.

CollectKit: LLM-driven intake and structured data capture into typed schemas. Next.js, Python, PostgreSQL.

Detect-and-Avoid system: radar target tracking with Extended Kalman Filters, computer vision, and ADS-B fusion. C++, Qt, Python.

CORE SKILLS

Languages: Python, C++, C#, TypeScript, JavaScript, SQL, Java, C, Visual Basic

AI and Machine Learning: PyTorch, OpenCV, NumPy, Pandas, computer vision, custom ML models, RAG, pgvector, LLM applications, agentic workflows, evaluation harnesses, guardrails, human-in-the-loop systems, LangChain, LiteLLM, Dify, MCP

Robotics and Autonomy: ROS, SLAM, Lidar and point cloud processing (PCL), Extended Kalman Filters, sensor fusion, radar tracking, path and motion planning, Gazebo, RViz, Eigen, Boost, ADS-B, Detect-and-Avoid, UAS Traffic Management

Full-Stack and Mobile: Next.js, React, React Native, Expo, Vue.js, Django, FastAPI, Node.js, REST APIs, Supabase, PostgreSQL, MongoDB, Stripe, Docker, CI/CD, Jenkins, Git, CMake, MQTT, Qt, Linux, Agile delivery, mentorship

Geospatial and Simulation: PostGIS, ArcGIS, Cesium, quadtree and multi-resolution spatial representations, weather and terrain data pipelines, Unity3D

EDUCATION AND RESEARCH

MSc Computer Science — University of Calgary

Calgary, Canada | 2026

- *Multiresolution Unmanned Aerial Vehicle (UAV) Risk Map Path Planning.* <https://hdl.handle.net/1880/125583>.
- Introduced a layered sampling quadtree for multi-resolution 3D risk maps and a risk-aware variant of A* for beyond-visual-line-of-sight UAV path planning, with an expected fatality rate bridge compatible with SORA.
- Mitacs Accelerate award for UAV risk modelling and visualization.

BSc Computer Science — University of Calgary

Calgary, Canada | 2019

- Focus on artificial intelligence, computer networks, privacy, and security. Completed with internship.

PROFESSIONAL EXPERIENCE

Founder and Lead Engineer — NuronsAI

Calgary, Alberta | Jun 2023 - Present

- Build and ship AI products end to end: RAG pipelines over pgvector, agentic workflows, custom MCP servers, evaluation harnesses, guardrails, and human-in-the-loop tooling, in Python, TypeScript, Next.js, LangChain, LiteLLM, Supabase, and PostgreSQL.

- Built and launched CollectKit (intelligent intake and structured data capture), Contract Analysis AI (end-to-end automated contracting for US Inc. 5000), Sales Prep AI (automated account research for ExtensisHR a US mid-market firm), and servicemenu.io (AI-generated service menus, quoting, and booking), reaching thousands of combined active users; own architecture, data models, infrastructure, and deployment for each.
- Built a video analysis engine that ingests footage, segments it into scenes, runs semantic analysis per scene, and selects and cuts clips against a stated purpose.
- Designed and shipped cross-platform mobile apps in React Native and Expo, including a fintech app owned end to end from API design through release.
- Deliver client AI systems for mid-market enterprises (200-500+ employees) and high-growth startups across HR (ExtensisHR), recruiting, sales, medical insurance (Ewings), and financial services; scope, architect, and build each one myself.

Senior Technical Solutions Manager – Wing (an Alphabet Company)

Palo Alto, California | Mar 2024 – Aug 2025

- Contributed to UTM safety systems: requirements definition, validation design, and issue resolution alongside the engineering teams.
- Translated FAA requirements for LAANC and B4UFLY certification into engineering requirements, acceptance criteria, and validation evidence.
- Led US delivery of Wing's UTM programs from kickoff through validation, including live demonstrations across multiple US states.

Senior Autonomy Software Developer – Avidbots

Kitchener, Ontario | Aug 2022 – May 2023

- Led research and development of control, planning, and autonomy software for production industrial cleaning robots, improving system efficiency and accuracy by 30%.
- Developed production robotics software in C++, Python, and ROS on Linux across planning, control, SLAM, navigation, and Lidar processing workflows.
- Integrated and developed ROS packages and custom heuristics using RViz, Gazebo, PCL, Boost, and Eigen.
- Investigated machine learning and probabilistic approaches to distributed path planning and control using PyTorch, NumPy, OpenCV, and regression and Bayesian methods.
- Delivered end-to-end software within a multidisciplinary product team, contributing to architecture, testing, documentation, and CI/CD.

Lead Autonomy Engineer – Shearwater Aerospace

Montreal, Quebec | Aug 2021 – Apr 2022

- Led development of UAV and commercial aircraft planning and management systems spanning algorithms, backend infrastructure, geospatial systems, data pipelines, and user-facing applications, and led technical execution through architecture, mentorship, and Agile delivery.
- Built full-stack aviation applications using TypeScript, Vue.js, Django, Cesium, ArcGIS, Python, and PostGIS.
- Designed machine learning and data processing frameworks that assimilated real-time weather and terrain data into UAV navigation and flight planning.
- Built automated weather data infrastructure processing large datasets through distributed workflows with optimized PostGIS storage, replacing a manual pipeline.
- Developed energy-aware aircraft path planning algorithms using dynamic weather data, producing flight paths 25% more energy-efficient and 30% shorter than conventional methods.

Senior Software Developer – Canadian UAVs

Calgary, Canada | Jan 2019 – May 2021

- Built UAV and aircraft Detect-and-Avoid systems combining radar, computer vision, aircraft tracking, and ADS-B.
- Developed a ground control station in C++ and Qt using VCSi, CMake, and Boost, and implemented radar target tracking with Extended Kalman Filters.
- Designed distributed ADS-B monitoring, storage, and API infrastructure using MQTT and Python, and managed radar data and systems in C# and MongoDB.
- Built radar and sensor simulation systems in Unity3D, working across embedded systems programming, visualization, and

rendering.

- Set company technical direction and IT infrastructure, directed a team of developers, translated customer insight into product strategy, ran flight test events and drone builds, and flew UAVs as a certified pilot.

Software Developer — Siemens

Calgary, Canada | Sep 2017 – Aug 2018

- Developed industrial device management and remote connectivity software using C++, Visual Basic, and T-SQL.
- Built software and DevOps tooling supporting a 50-plus device industrial testing lab using Jenkins, Docker, and VMware.

CERTIFICATIONS

Robotics: Aerial Robotics, Computational Motion Planning, Mobility, Perception, Estimation and Learning

AI and Data: Deep learning with TensorFlow and Keras, OpenCV for Python, explainable AI, machine learning foundations

Other: Transport Canada sRPAS VLOS Pilot, Cisco CCNP, Project Management, Mechanical Robotics, Graphic Design, WSET Wines Level 1