

Krupal Shah

780-716-8607 | krupalshah74@gmail.com | [linkedin.com/in/krupalshah74](https://www.linkedin.com/in/krupalshah74) | github.com/Krupal-Shah

EDUCATION

University of Alberta

Edmonton, AB

Bachelor of Science in Computing Science Honors in AI

*Expected Graduation **May 2027***

- **GPA:** 3.8 / 4.0
- **Relevant Coursework:** Database Management System, Algorithms, Machine Learning 1 & 2, Ethics in Data Science & AI, Introduction to AI
- **Scholarships:** A University of Alberta Undergraduate Scholarship (International)

WORK EXPERIENCE

Research Assistant

Sep. 2024 - Sep. 2025

University of Alberta

Edmonton, AB

- Spearheaded the development of a Python-based simulator using **Open3D** to simulate accident-prone scenarios occurring due to the A-Pillar of a vehicle.
- Optimized and **automated** the simulation pipeline to execute over **5000 simulations in parallel**, reducing execution time by more than **10 days**.
- Explored real-time rendering concepts and integrated **3D math fundamentals** such as coordinate transforms, ray tracing, rotations matrices etc.
- Developed a **graph neural network model** to predict traffic volumes of the city using spatial relationships and limited data.
- Built and trained **time series forecasting models** to predict traffic volumes and sensor readings using historical trends and spatial-temporal features.
- Optimized existing **semantic segmentation models** to improved classification of roadway features such as lanes, solid lines, shoulder etc. from LiDAR data.
- Worked in-depth with Hesai LiDAR, IMUs, and cameras, integrating and utilizing their vendor-provided SDKs, to design and develop a single, stable Qt application capable of handling and recording all data streams.
- Designed and 3D-printed custom CAD enclosures for LiDAR and companion sensors, creating a modular unit which is high-speed-stable and easily detachable roof mount.
- Collaborated with a multidisciplinary team to apply transportation engineering insights with technology, contributing to a successful **peer-reviewed conference publication**.

Teaching Assistant

Sep. 2025 - Present

University of Alberta

Edmonton, AB

- Supported instructors for two courses - Formal Systems and Introduction to Artificial Intelligence - by assisting with assignment grading, seminars, and lab sessions.
- Led seminar and lab sessions, teaching core concepts, guiding problem-solving, and addressing student questions.
- Evaluated weekly quizzes and final exams, providing timely, constructive feedback to support student learning.

EXTRA-CURRICULAR LEADERSHIP EXPERIENCE

Software Developer

Sep. 2025 – Present

University of Alberta Formula 1

Edmonton, AB

- Developing an **autonomous vehicle** capable of completing tracks using Pure Pursuit trajectory planning, LiDAR, and camera-based perception algorithms.
- Designed and integrated a modular ROS2-based autonomy stack, interfacing multiple third-party SDKs and custom algorithms while maintaining clean, decoupled node architectures.
- Developed a cloud-based data pipeline to transmit vehicle telemetry to the ground station via AWS, enabling real-time visualization and long-term storage with performance statistics.
- Collaborated in a cross-functional team using Git for version control, managing branches, issues, and pull requests to streamline development.

Software - Deputy Team Lead

Oct. 2023 – Sep. 2025

STARR (Student Team for Alberta Rocketry Research)

Edmonton, AB

- Built an app in QT using C++ Object Oriented Paradigm to track the rocket, collect, parse and store the data
- Integrated real-time **camera streaming** into the ground station software, enabling live video feed monitoring from the rocket during flight simulations and testing.
- Followed the Software Development Life Cycle (SDLC) and AGILE practices, setting milestones, version control, **units test** and maintaining quality standards.
- Facilitated productive discussions and decision-making processes during club meetings, ensuring all members had the opportunity to contribute ideas and provide feedback.

TECHNICAL PROJECTS

- Event Lottery System Application** | *Java, Firebase* Oct. 2025 – Present
- Developed a mobile application for fair event registration using a lottery-based system, enabling entrants to join waiting lists via QR code and organizers to randomly select attendees.
 - Applied software engineering concepts including object-oriented design, UML modeling, and modular architecture to ensure extensibility and maintainability.
 - Collaborated with a team using Git for version control, tracking changes, managing issues, and reviewing pull requests to streamline development.
- VISARM - Color Sorter** | *Python, AutoCAD Fusion* Oct. 2025 – Present
- Engineered a complete 4-DOF robotic pick-and-place system, implementing inverse/forward kinematics, workspace calibration, and vision-based control entirely from scratch.
 - Built a calibrated color-sorting pipeline using OpenCV, including lens-distortion correction, checkerboard-based frame mapping, object detection, and robot-frame coordinate transformation.
 - Developed real-time motion planning and closed-loop trajectory execution in Python, integrating grasp verification and error-analysis routines for reliable autonomous manipulation.
- MixMe - AI SaaS** | *LLMs, MySQL* Jul. 2024 – Aug. 2024
- Developed an AI-SaaS application using Next.js by integrating advanced AI models such as Cohere.AI and Replicate AI to deliver intelligent services to users.
 - Integrated fine-tuned model endpoints and prompt engineering techniques to enhance response relevance and personalization across user queries.
 - Built subscription capabilities, allowing users to upgrade to pro subscription plans and implemented API usage limits for free usage.
- Dynamic Wallpapers** | *PyQT, Bash* Sep. 2024 – Oct. 2024
- Developed a PyQt application to refresh wallpapers daily and display information on a system-tray window.
 - Implemented error handling and logging mechanisms to improve script reliability, achieving a 100% uptime in scheduled tasks.
 - Reduced download time by **30%** using efficient HTTP requests and multi-threading techniques.
 - Delivered a user-friendly solution by integrating customizable configuration options such as automatically loading it on startup.

CERTIFICATIONS

- Deep Learning Specialization** | *Coursera, Deep Learning - Andrew Ng* May 2024 – Jul. 2024
- Learned the foundation of neural network architectures such as CNN, RNN, LSTMS.
 - Applied these skills on real world cases such as speech recognition, music synthesis, chatbots, machine translation, natural language processing, and more
 - Learned various optimization techniques to fine tune a model / neural network.

TECHNICAL SKILLS

Languages: C++, Python, JavaScript, Java, SQL, Bash, RISC-V, ROS2

Libraries/Frameworks: Tensorflow, PyTorch, Flask, Qt6, PyQt, Numpy, Pandas

Tech: AutoCAD Fusion, VS Code, Docker, Linux, MySQL, MongoDB, Figma, Git, Android Studio, Firebase