Shahzaib Ahmed

403-597-2257 | shahzaib@ualberta.ca | linkedin.com/in/shahzaib-ahmed | github.com/Shozy3

PUBLICATIONS

Suarez Suarez, R.G., Parsaee, A., **Ahmed, S.**, Huynh, H.Q., Shaikh, A., Otley, A., Jacobson, K., Sherlock, M., Mack, D.R., Deslandres, C., El-Matary, W., Crowley, E., deBruyn, J., Walters, T., Griffiths, A.M., Greiner, R., Wine, E., The Canadian Children IBD Network. *Machine Learning Predicts First Bowel Resection in Pediatric Crohn Disease Patients.* (in preparation)

EXPERIENCE

Machine Learning Research Assistant — Transportation Engineering
May 2025 – Present
SMART Mapping Lab, Civil & Environmental Engineering, UAlberta — *Edmonton, AB*

- Developed and deployed **LiDAR semantic segmentation pipeline** using **Point Transformer v2**, achieving **78.3% mean IoU** across 11 highway infrastructure classes; analyzed feature attribution with **XAI methods** (Integrated Gradients, Grad-CAM).
- Designed **sensor fusion pipeline** integrating YOLOv8 vehicle detection, ByteTrack multi-object tracking, and GPS/IMU data for mobile curbside surveys.
- Automated acquisition and structured parsing of 400+ North American traffic accident reports, generating statistical summaries on crash types, contributing factors, and injury severity distributions.
- Performed **intersection crash data analysis** to assess policy impact of speed enforcement cessation in Edmonton, identifying statistically insignificant variance in post-policy speed behavior.
- Reviewed **Graph Neural Network models** (GraphWaveNet, DCRNN) for spatio-temporal traffic forecasting and documented scalability trade-offs for urban transport datasets.

Applied Machine Learning Researcher
May 2024 – May 2025
Faculty of Medicine & Dentistry, UAlberta — *Edmonton, AB*

- Processed **58K+ clinical data points** from 934 pediatric Crohn's patients using **mRMR feature selection** (**80%** dimensionality reduction).
- Developed survival models (**Random Survival Forest, Cox PH**) achieving **96% C-index**; optimized with multithreaded training (**40% faster**).
- **Co-authored publication:** *Machine Learning Predicts First Bowel Resection in Pediatric Crohn Disease Patients.*

Software Development Intern
Jan 2024 – Oct 2024
Government of Alberta, Environment & Parks — *Edmonton, AB*

- Re-architected **Python data pipeline** with concurrency and profiling, achieving **5.5× speedup**.
- Deployed **$6K NAS** infrastructure replacing cloud storage, saving **$94K annually**.
- Integrated geospatial workflows using **ArcGIS Pro** with automated validation across heterogeneous data sources.

Computer Vision Research Assistant
Feb 2023 – Sept 2023
Department of Civil & Environmental Engineering, UAlberta — *Edmonton, AB*

- Migrated tracking system from **SORT to DeepSORT**, improving vehicle identity persistence and tracking reliability.
- Built wildfire visualization web app with automated **satellite imagery pipeline**; ported 400+ lines of MATLAB to Python.

TECHNICAL SKILLS

Languages: Python, C++, Java, JavaScript, SQL, MATLAB
ML/DL Frameworks: PyTorch, TensorFlow, scikit-learn, YOLO, DeepSORT, Point Transformer v2
Tools & Infrastructure: FastAPI, Flask, Git, Linux, Docker, Qt, CMake, OpenCV, ArcGIS, SQLite
Coursework: Data Structures, Algorithms, Operating Systems, Databases, Machine Learning

PROJECTS

Primrose – Personal Reading Management System | *C++17, Qt 6, SQLite, CMake* — 2025

- Developed cross-platform reading analytics app using **MVC architecture** and modern C++ design patterns (Factory, Observer, Strategy).
- Designed **SQLite schema** with relational integrity, transaction-safe CRUD, and session analytics integration.
- Implemented adaptive **reading-speed estimator** and time-prediction model using session difficulty and genre weighting.

Explainable AI Diagnostic Framework | *PyTorch, FastAPI, XAI Methods* — 2025

- Built open-source diagnostic system integrating **Integrated Gradients, Grad-CAM, and LRP** for model interpretability.
- Implemented unified adapter supporting image and point-cloud models; generated **interactive dashboards and PDF reports**.
- Project extended in collaboration with SMART Mapping Lab; anticipated authorship acknowledgment.

EDUCATION

University of Alberta
Edmonton, AB
Bachelor of Science in Computer Software Engineering, Minor in Mathematics — *Sept 2020 – Apr 2026 (expected)*