Roshan Banisetti

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Education

University of Alberta Edmonton, AB
Bachelor of Science in Computing Science (Honors) **Expected Graduation:** May 2027

Work Experience

Renewable Thermal Laboratory Edmonton, AB
Machine Learning Research Assistant Jan 2025 - Present

- Designed and implemented a Physics-Informed Neural Network (PINN) in Python, enhancing model accuracy by 25% and reducing validation error by 18% through physics-based constraints for solar thermal systems.
- Identified and optimized key performance variables for liquid-based solar thermal receivers, boosting energy efficiency by 30% in experimental conditions.
- Enhanced MATLAB-based genetic algorithms through vectorized operations and parallel computing, achieving 83% reduction in simulation runtime while maintaining 99.2% solution accuracy.
- Automated data processing pipelines for 100,000+ row thermal datasets across multiple files, streamlining analysis workflows and reducing manual processing time by 65%.

Project Experience

DevSwipe | Android Application **Kotlin | Spring Boot | PostgreSQL**

- Architected an Android application that enabled students to discover side project ideas and collaborators, resulting in 400+ swipes and 120+ collaboration requests in the first month of testing.
- Engineered a custom backend using Spring Boot and PostgreSQL, implementing secure JWT-based authentication to manage 100+ user sessions without third-party dependencies.
- Integrated post-swipe one-on-one chat functionality, empowering users to initiate conversations immediately after a successful match, streamlining the team formation process and increasing active connections by 73%.

Flight Delay Predictor | End-to-End ML System **Python | Spring Boot | Docker | AWS EC2**

- Deployed a real-time flight delay prediction system using Python (LSTM) and Java Spring Boot, achieving 85% accuracy across 5,000+ flight and weather records via REST APIs.
- Built a scalable ML inference pipeline integrating a Python model server with a Java Spring Boot backend on AWS EC2, delivering low-latency flight delay predictions for 120+ concurrent API requests.
- Boosted model accuracy by 20% through advanced feature engineering, weather data integration, and hyperparameter tuning; implemented CSV-based batch prediction for bulk forecasting.

Neural Network Car | AI Simulation **Python | PyTorch | Pygame | NumPy**

- Developed a custom neural network using Python and PyTorch, achieving 30% improvement in vehicle navigation accuracy through real-time sensor input processing.
- Created ray-casting obstacle detection algorithms, improving collision avoidance by 40% and enabling safer autonomous navigation in simulation environments.
- Configured JSON-based data persistence for neural network states, enabling continuous learning and improving training efficiency by 60% across simulation sessions.

Skills

Languages: Python, Java, Kotlin, C/C++, JavaScript, SQL, R
Developer Tools: Git, Docker, AWS (EC2, S3, Lambda), Linux/Unix, Jupyter Notebooks, VS Code
Libraries/Frameworks: TensorFlow, PyTorch, Spring Boot, REST APIs, React, Node.js, Django, Flask, FastAPI, Android SDK, JUnit, Firebase, MongoDB, PostgreSQL