Kush Madan

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Education

University of Waterloo **Sep. 2023 – Present**
Candidate, Bachelor of Mathematics, Statistics *Waterloo, Ontario*

Coursework/Certifications

- Data Structures
- Object Oriented Programming
- Algorithm Design and Data Abstraction
- Statistics - Probability
- Azure Fundamentals
- Azure AI Fundamentals

Skills Summary

Languages: Javascript, CSS, HTML, Python, C, C++, SQL, R
Tools/Frameworks: Django, Azure, Git, Spark, Scikit-learn, Pandas, Numpy, PyTorch, Power BI, Databricks, Cursor

Experience

Data Science Intern **January 2025 – April 2025**
Transport Canada *Ottawa, ON*

- Optimized data pipelines in **Azure Databricks**, **improving run-time by 92%** through efficient transformation logic and pipeline tuning.
- Developed optimized SQL queries, Python scripts, and DAX expressions to analyze and model data, driving actionable insights.
- Designed and built interactive Power BI dashboards and reports to support data-driven decision-making across the organization.

Software Engineer - Autonomy **September 2024 – Present**
Waterloo Aerial Robotics Group (Design Team) *Waterloo, ON*

- Utilized **YOLOv8-based computer vision** techniques to implement object detection for drones using **PyTorch for model training**, achieving **95% accuracy in detecting landing** pads.
- Engineered autonomous Python algorithms for aerial systems, enabling extended pilot-free operation and decision-making in real-time
- Designed dynamic route-planning software for drones, capable of adapting flight paths based on real-time internal diagnostics and external environmental inputs

Naval Combat Informations Operator **January 2023 – Present**
Royal Canadian Naval Reserves *Kitchener, Ontario*

- Completed Basic Military Qualification, mastering advanced time and stress management techniques through rigorous operational training, enhancing team efficiency and readiness under high-pressure scenarios

Projects

Cross-Platform Malware Detection (in progress) | *Python, TensorFlow, OpenCV, macOS/Windows*

- Designing a **Convolutional Neural Network (CNN)** to detect malware by converting binary files into grayscale images and classifying them as benign or malicious
- Building a secure dataset of macOS and Windows binaries using isolated virtual machines to gather and preprocess malware samples safely
- Planning to train and optimize the model for **cross-platform generalization and detection accuracy** using TensorFlow and image-based classification techniques

Web Scraper and Sentiment Analysis Machine Learning Model | *Python, Beautiful Soup, Scikit-learn*

- Developed and implemented a sentiment analysis model using an **SVM machine learning model** with a linear kernel using scikit-learn, achieving an overall **accuracy of 81%** on a test dataset of **2,748** samples
- Optimized data preprocessing with custom stopword removal, feature extraction using TF-IDF vectorization, and hyperparameter tuning to enhance model performance
- Integrated the model into a Python-based application capable of analyzing sentiment from both manually inputted text and **web-scraped content** using the Beautiful Soup library, providing real-time sentiment categorization