Rani Adhaduk

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Canadian Citizen

Education

University of Ottawa, Ottawa • April 2021
Master of Computer Science

Work Experience

Canada Post Corporation — System Analyst II (Machine Learning Engineer) AUG 2021 - CURRENT
Ottawa, ON

- Designed and implemented a scalable PySpark pipeline in Foundry to consolidate weekly volume forecasts using holiday and non-holiday models with grouped pandas UDFs. Trained the models using Prophet and enriched outputs with metadata, historical actuals, and fiscal week dimensions. Achieved a 5% forecasting error using MAPE for model evaluation.
- Developed an XGBoost-based Service Number Arrival Prediction model in Palantir Foundry with a pre-processing data pipeline, feature engineering, and daily predictions; evaluated using RMSE (15%), precision, recall, and F1 score. Integrated model outputs with a dashboard for real-time validation against actual arrivals. Optimized performance through hyperparameter tuning and synthetic data generation.
- Applied advanced analytics in building the Parcel Analytical Tool (PAT) using Python/SQL and ETL processes to track parcel delays across plant stages. Implemented weekly and flash modes for real-time analysis, adding categories like Dispatch Late and Return items. Delivered a Power BI dashboard, enabling plants to achieve a 96% cutoff rate nationwide.
- Designed and implemented data warehouses, data marts, and models to optimize storage and retrieval; engineered ETL pipelines and automated data workflows for seamless integration. Managed database administration for large Teradata (database) tables and ensured data integrity.
- Collaborated in Agile/Scrum teams to manage sprints, perform backlog grooming, and deliver incremental releases while aligning with business goals and ensuring stakeholder communication. Regularly contributed to problem solving and root cause analysis for complex technical issues in information flow, dashboards, and data consistency. Promoted collaborative communication across departments, ensuring clarity in requirements gathering, status reporting, and results sharing.

Algonquin College — PT Professor JANUARY 2025 – AUGUST 2025
Ottawa, ON

- Delivered an advanced machine learning (artificial intelligence) course by designing and implementing modules on data preprocessing, feature engineering, dimensionality reduction, classification, clustering, anomaly detection, and model evaluation using tools like PCA, LDA, SVM, ANN, and Power BI/Tableau, enabling students to build, evaluate, and visualize end-to-end ML solutions effectively.
- Delivered a comprehensive course on computer vision and deep learning by guiding students through image representation, traditional image processing, CNN architectures, and model evaluation using tools like PyTorch and OpenCV , enabling them to build, fine-tune, and analyze vision-based ML systems for real-world applications.
- Delivered a foundational programming course in Java by teaching algorithm design, flowcharting, pseudocode, object-oriented programming, debugging, and version control using tools like Eclipse and Git, enabling students to develop, test, and document robust Java applications with industry-standard practices

National Research Council — Coop Student MAY 2020 - DEC 2020
Ottawa, ON

- Designed and implemented a novel KCR algorithm and its variants by optimizing objective functions for supervised, unsupervised, and anomaly detection tasks, benchmarking against standard algorithms like KMeans++, DBSCAN, and visualizing results using Python libraries, which enabled robust clustering, outlier detection, and real-time learning deployment via AWS services including S3, SageMaker.
- Supported project management tasks by preparing documentation, sprint updates, and progress tracking in research initiatives.

Personal Projects

Scan2Sort : Multi-Agent System & Tool Orchestration for Real-Time Visual Classification (2025)

- A multi-agent system classifying waste via visual inputs. It orchestrates Vision and Policy agents using MCP-style tools to bridge deterministic local rules with generative AI backstops. Features stateful memory and structured observability, ensuring accurate, context-aware decision-making while mitigating hallucinations.

Paper Publications

Co-author, **Online Anomaly Detection for Streaming Data Implemented on Top of Kafka, Scikit-Multiflow and River**, Springer, Jan 2022. DOI: 10.1007/978-3-030-89912-7_63

Co-author, **Exploring the Performance of EEG Signal Classifiers for Alcoholism**, Springer, 2020. DOI: 10.1007/978-981-15-3514-7_12.

Research Author, **METALLIC: Metalearning for Tackling the Class Imbalance Problem**, 2021 - Academic Research.

Skills Interests

Technical Knowledge: Python, SQL, SPARQL, C, C++, C#, Java, TypeScript, Excel, CRM, Database Administration, Cloud (AWS)

Tools: Palantir, Teradata Studio, Jupyter Notebook, Pycharm, Weka, Protege, Eclipse, Android studio, Visual studio, Tableau, PowerBI

ML Platforms and Libraries: Keras, TensorFlow, Scikit-learn, StatsModels, NumPy, Pandas, Matplotlib, Scipy, Imblearn, NLTK, MultiFlow, Pytorch, Pyspark, Classification and Regression (Linear, Logistic, KNN, SVM, Decision Tree, Ensemble), Clustering (K-means, Agglomerative, DBSCAN), Resampling strategies (SMOTE, ADASYN, NEARMISS, RandomUnderSampler), Feature Selection, Feature Dimensionality Reduction, Outlier Detection, Online Learning (MultiFlow), Neural Nets for NLP and Computer Vision Applications

Methodologies: Agile, Scrum, CI/CD, Version Control, Project Management, End-to-End ML Pipelines

Interpersonal Skills: Teamwork, Communication, Motivation, Time Management, Critical Thinking, Problem Solving, Positive Attitude

Certifications: PMP (Project Management Professional) – In Progress

Language : English, French (A1)