Manav Patel

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EDUCATION

Toronto Metropolitan University (Formerly Ryerson University) **Toronto, Ontario, Canada**

MEng. Electrical and Computer Engineering – Artificial Intelligence, 3.7/4.0 GPA *May 2024 – Aug 2025 (Expected)*

- **Relevant Coursework:** Neural Networks, Deep Learning, Advanced Data Engineering, Natural Language Processing, Text Mining, Secure Machine Learning, Spatial Data Analysis, Graph Mining

BEng. Computer Engineering – Software Specialization *Sept 2019 - Apr 2024*

- **Relevant Coursework:** Data Structures & Algorithms, Intelligent Systems, Computer Vision, Distributed & Cloud Computing

WORK EXPERIENCE

ML Research Assistant **May 2025 – Present**

Toronto Metropolitan University – CVIP Lab *Toronto, Ontario, Canada*

- Supporting research on CT image denoising by enhancing a **CNN-based** architecture (SCUNet) with **transformer** modules (NGSwin) to improve feature learning and metal artifact suppression.
- Modified the architecture to add a transformer branch to SCUNet, enabling hybrid feature extraction and improved denoising.
- Designed a **PyTorch** workflow that automates data loading, training, and SSIM/PSNR evaluation, accelerating model experiments.

Junior Software Engineer **Sept 2024 – Present**

Cashly Inc. *Oakville, Ontario, Canada*

- Designed a communications system for an **AI-driven** CRM platform, including email, SMS, and calls components with Twilio and Gmail API, allowing users to automate campaigns and increase lead outreach by **3x**.
- Automated workflows using **n8n**, used **LLMs** to extract data from unstructured inputs, reducing manual effort by **60%** and costs by **80%.**

.NET Software Developer Intern **May 2023 – Aug 2023**

FGF Brands *Toronto, Ontario, Canada*

- Developed internal tooling features in **ASP.NET MVC** for workflow and vendor systems, improving efficiency for **1,500+** employees.
- Optimized **SQL** queries and improved indexing strategies to make database operations more efficient.
- Implemented automated unit tests with **Selenium** and **C#**, achieving **85%** test coverage and minimizing bugs before deployment.

Backend Developer Intern **Sept 2022 – Apr 2023**

Lockheed Martin *Ottawa, Ontario, Canada*

- Built **REST APIs** with **Express.js** for CRUD operations and managed **PostgreSQL** databases for an internal training platform.
- Refactored an **NLP** pipeline to extract and categorize training data from large documents using **SpaCy** and **RoBERTa**. Integrated it into the training platform to automate text mining and streamline training recommendations, reducing manual effort by **60%.**

PROJECTS

RDENet Oscillation Block | *PyTorch, NumPy, Scikit-Learn* ***GitHub***

- Enhanced **ResNet** by integrating an Oscillation Block with **PyTorch**, improving classification robustness against poisoned images.
- Built and optimized a machine learning pipeline with 5-fold cross-validation, improving accuracy by **7%** over baseline methods.
- Trained and compared evaluations from **XGBoost** and **Random Forest** models and displayed results in a **Flask** web app.

Humour Classifier | *PyTorch, NumPy, Pandas, Scikit-Learn, SpaCy, ConceptNet* ***GitHub***

- Developed a humour detection model using a Shared-Private **BERT** architecture, integrating **ConceptNet** embeddings to improve contextual understanding, achieving **~3%** higher classification accuracy.
- Preprocessed **200,000+** samples across four datasets, optimizing data pipelines and embedding workflows to improve model results.

Movie Success Predictor | *Pandas, NumPy, Scikit-Learn, TensorFlow* ***GitHub***

- Trained a **Random Forest** model on metadata from **7,500+** movies after preprocessing the dataset and feature engineering.
- Implemented a **BERT-LSTM** model to capture sentiment from movie scripts using BERT embeddings and LSTM-based sequence modelling; combined outputs with Random Forest predictions to determine overall movie success.

Credit Scoring and Anomaly Detection | *Pandas, NumPy, Scikit-Learn, Matplotlib, Seaborn* ***GitHub***

- Simulated data poisoning attacks like label flipping and feature manipulation on credit models and analyzed baseline performance.
- Integrated **anomaly detection** (Isolation Forest, Autoencoders, etc.), improving model performance by **6%** under adversarial scenarios.

TECHNICAL SKILLS

Languages: Python, JavaScript, Java, C#, SQL, MATLAB, C, C++
Frameworks & Libraries: FastAPI, PyTorch, TensorFlow, Keras, NumPy, Pandas, Scikit-learn, Matplotlib, Flask, Langchain, Ollama
Data: PostgreSQL, MongoDB, MySQL, Hive, Spark, Hadoop, BigQuery, Cassandra, Elasticsearch, Kibana, Neo4j
Cloud & DevOps: GCP, AWS, Azure, Docker, Kubernetes
Concepts: ETL Pipelines, Big Data, Retrieval Augmented Generation (RAG), Prompt Engineering, Image Processing, Generative AI