Manav Patel

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EDUCATION

Toronto Metropolitan University (Formerly Ryerson University) **Toronto, Ontario, Canada**
MEng. Electrical and Computer Engineering – Artificial Intelligence, GPA: 3.7/4.0 *May 2024 – Aug 2025 (Expected)*

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

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

- **Relevant Coursework:** Data Structures & Algorithms, Software Design & Architecture, Object-Oriented Programming, Operating Systems, Distributed & Cloud Computing, Intelligent Systems, Software Testing, Network Security

SKILLS

Languages: Python, Java, JavaScript, TypeScript, Go, C, C#, SQL, HTML/CSS
Libraries/ Frameworks: Express, React, Next, FastAPI, Flask, Django, ASP.NET, JUnit, Selenium, TestNG, gRPC
Machine Learning: PyTorch, TensorFlow, Keras, NumPy, Pandas, Scikit-learn, Matplotlib, Langchain, Ollama
Data: PostgreSQL, MongoDB, MySQL, SQL Server, BigQuery, Elasticsearch, Redis
DevOps & Tools: Docker, Kubernetes, Google Cloud Platform, Amazon Web Services, Azure, GitHub Actions, Git, Postman
Concepts: Backend, Full-stack, Microservices, Retrieval Augmented Generation, Prompt Engineering, Image Processing, LLM Agents, Generative AI

WORK EXPERIENCE

ML Research Assistant **May 2025 - Present**
Toronto Metropolitan University – Computer Vision and Image Processing Lab (CVIP) *Toronto, Ontario, Canada*

- Supporting research on a **GAN-based** metal artificial reduction framework for CT imaging, contributing to evaluation, baseline comparisons, and **transformer-based** model refinement for improved artifact suppression. (MEng. Thesis)

Junior AI & Software Engineer **Nov 2024 – Present**
Cashly *Oakville, Ontario, Canada*

- Developed a multi-channel communication system with Twilio and Gmail API, enabling targeted outreach for mortgage leads, increasing conversion by **3x**.
- Automated workflows using **n8n**, integrating LLMs to extract data from unstructured inputs, reducing manual effort by **60%**.
- Refactored code for an entire AI-driven CRM to a **Next.js** and Supabase app, reducing tech debt and optimizing structure.

Teaching Assistant **Sept 2024 – Apr 2025**
Toronto Metropolitan University *Toronto, Ontario, Canada*

- Led **Java** OOP, **JUnit** testing, and software architecture labs, providing hands-on instruction in debugging, deployment, and best practices using technologies such as **Tomcat, MySQL, Kubernetes, Docker, and Google Cloud** for **50+** students per semester.

.NET Software Developer **May 2023 - Aug 2023**
FGF Brands *Toronto, Ontario, Canada*

- Engineered new features for the Intranet, Workflow Management, and Vendor Management Systems using **ASP.NET MVC**, improving usability for **1,500+** employees.
- Optimized **MS SQL Server** databases by refining queries and indexing strategies, reducing latency and enhancing data retrieval.
- Implemented automated unit tests with **Selenium** and **C#**, achieving **85%** test coverage and minimizing bugs before deployment.

Backend Developer **Sept 2022 - Apr 2023**
Lockheed Martin *Ottawa, Ontario, Canada*

- Built **REST APIs** with **Express.js** for CRUD operations and managed a **PostgreSQL** database 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

JobOS | *Next.js, Django, Supabase, LLMs, Redis, Docker, AWS* **jobos.tech**

- Developed a job board and scraping platform that lets users view or auto-add job listings by simply providing a company name.
- Designed a pipeline that extracted job listings from **500+** companies by searching for career sites via DuckDuckGo Search API and dynamically crawling top-ranked URLs with Crawl4AI library, **Playwright**, and small **LLMs** to locate exact career pages.

BiasAware - Capstone Project | *React.js, Express.js, MongoDB, Python, HuggingFace, Render* **biasaware.social**

- Spearheaded the development of a research-driven full-stack web app showcasing social biases in AI-generated images.
- Assembled a dataset of **3,000+** images across 12 bias categories using prompt engineering to analyze biases.
- Trained and fine-tuned a **Stable Diffusion** text-to-image model on a custom dataset to study and reveal bias in GenAI models.

Team8 | *Flutter, Go, PostgreSQL, AWS, GitHub Actions* **team8.live**

- Built a mobile and web app using ***Flutter***, enabling users to discover and chat about recreational sports and gaming plans.
- Deployed a **Go** backend with **PostgreSQL** and **Redis** to support real-time chats and updates, using **AWS App Runner** and **GitHub Actions** for **CI/CD** automation.

DealScout | *Angular, Spring Boot, MySQL, RabbitMQ, Kubernetes, Google Cloud* **dealscout.site**

- Built a price comparison tool that scrapes and ranks listings from online stores using Selenium and custom ranking logic.
- Deployed containerized microservices with **Docker** and **RabbitMQ** on **GKE** and hosted the frontend on **Cloud Run**.

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.

Weather-Based Traffic Prediction | *NumPy, Scikit-Learn, GeoPandas, Google Earth Engine, Flask* **GitHub**

- Implemented a predictive pipeline analyzing **250,000+** records across five datasets to forecast Toronto traffic collision risk based on weather conditions, standardizing spatial-temporal features and engineering new input variables.
- 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.