DIP VIJAYKUMAR PATEL

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Summary

Master's/MEng graduate in Computer Engineering (AI/ML) from University of Waterloo with ∼1 year of hands-on experience in full-cycle model development. Skilled in transformers, CNNs, time-series models, big data systems, and scalable ML deployment with Docker, Kubernetes, and AWS CI/CD.

Skills

- **Languages** : C, C++, Java, Python, JavaScript, TypeScript | **ML/DL Framework** : PyTorch, Scikit-learn, Keras
- **Machine Learning & AI** : Computer vision(CNNs, Vision-Transformer), Generative Adversarial Network(GANs), Time-Series Analysis, NLP (RNN, LSTM, Word-Embeddings), Transformer(T5, BERT, BART, Llama, GPT-2, Gemini-1.5-Flash)
- **Big Data Tools** : Hadoop, HDFS, HBase, Pig Latin, Spark, Spark SQL, Kafka
- **Optimization & Mathematics** : Linear/Non-linear Optimization, Convex-optimization, Discrete optimization(Dynamic Program, Flow-algorithms), Discrete Math & Theory of Computation
- **Software development & Tools** : Distributed System, Git, CI/CD, Docker, Kubernetes

Professional Experience

AI Research Associate, Cistel, Canada — Jan 2025 - Present

- Collaborated with **PhD scholars and professors from University Of Waterloo** on AI-based diagnostics for mechanical equipment, improved model performance through iterative research and feedback.
- Built data preprocessing **pipelines in PyTorch** for the Paderborn bearing dataset, automating manual processes that improved data preparation efficiency and reduced processing errors.
- Improved classification performance to **78% (multi-class)** and **98% (binary)** by addressing class imbalance and designing a novel evaluation method, which prevented data leakage during model assessment.

Research Associate, Indian Space Research Organization (ISRO) — Dec 2022 - May 2023

- Classified sea ice using SAR imagery to **monitor northern waterways and forecast ice levels** for climate change analysis.
- Engineered data pipeline automation using **Bash scripting** for ASF-VERTEX data acquisition, reducing manual processing time from 1 hours/day to near-zero for a dataset of 36 SAR images.
- Optimized image preprocessing by implementing **parallel computing solutions** using **Python's multiprocessing**, improving execution speed by 84% (25 minutes to 4 minutes) for 12GB of SAR data.
- After conducting a comprehensive literature review, selected **Conv-LSTM(97.33%) and ResNet(96%)** for training on the acquired SAR data.
- Completed the project with a detailed report documenting the entire methodology. Additionally, assisted the team with **code review** for TransAISformer, a model designed to predict approximate ship locations.

Projects

ClickBait Classification and Generation — May 2024 - Sept 2024

Tech stack used: *Pytorch, LLMs, NLP Pre-processing, Airflow, Parallel computing, HuggingFace*

- Built a clickbait classification model for social media, **achieving 72% accuracy (outperforming SemEval23's baseline of 68%)**. Leveraged pre-trained transformers and experimented with ML & deep learning techniques.
- Fine-tuned T5/BART/BERT/Llama for clickbait generation **(METEOR: 0.299)** using Hugging Face and mixed-precision training.

Personalized AI Chatbot for Portfolio — Jan 2025 - May 2025

Tech stack used: *Python Flask, PyTorch, NLP, Huggingface, Langchain, AWS*

- Optimized Google **Gemini-1.5-Flash** with domain-specific prompting strategies to enhance response quality
- Built a recruiter-facing chatbot using **RAG** to deliver personalized, context-aware responses, boosting engagement.
- Secured REST API using **Nginx reverse proxy on AWS with HTTPS**, achieving **99% uptime and <500ms average latency**.

Education

M.Eng in Computer Engineering (GPA - 4/4), University of Waterloo — May 2024 - Aug 2025

Relevant courses: Tools of Intelligent System Design (**ECE567**), Data & Knowledge Modeling Analysis (**ECE657a**), Text Analytics (**MSE641**), Introduction To Optimization (**ECE602**), Algorithm Design & Analysis (**ECE606**)

B.Tech in Computer Engineering (GPA - 4/4), Birla Vishvakarma Mahavidyalaya (BVM) — Jul 2019 - Aug 2023

Relevant courses: Machine Learning (**3CP10**), Data Analytics and Visualization (**4CP02**), Database Management System (**2CP01**), Theory of Computation (**3CP06**), Compiler Design (**4CP01**)

Achievements

ECE Master of Engineering Award of Excellence, University of Waterloo, Canada — Jan 2025

- Awarded for **outstanding academic performance** in the MEng. ECE program.

Academic Excellence Award, Birla Vishvakarma Mahavidyalaya (BVM) — May 2023

- Awarded for **outstanding academic performance** in the MEng. ECE program.