Rupin Khadwal

Toronto, ON | +1(905) 612 1374 | rupin.khadwal@hotmail.com | linkedin.com/in/rupin-khadwal | rupink.github.io

Education

University of Toronto Sep. 2024 - Aug. 2025
Master of Engineering (Thesis), Research in Graph Neural Networks, Supr. Prof. Chi-Guhn Lee *Toronto, ON*

University of Toronto Sep. 2019 - May 2024
Bachelor of Applied Science in Engineering Science, Major in Machine Intelligence *Toronto, ON*

Experience

University of Toronto **Toronto, ON**
Research Assistant *Jun. 2024 - Present*

- Designed and implemented a spatial-temporal Graph Neural Network (GNN) for Unilever's demand forecasting, improving prediction accuracy by 12% over SARIMA and STGCN models on a 3-year dataset (10M+ data points) at the University of Toronto's Dynamic Optimization Operations Management Lab
- Deployed large-scale spectral GNN simulations on AWS EC2 using Ubuntu and SSH, processing 50,000+ transactions per second on Canada Compute, reducing computational latency by 30%.

Teaching Assistant *Sep. 2024 - Dec. 2024*

- Instructed 150+ students in MATLAB and Python for numerical linear algebra applications, designing 5+ hands-on labs featuring regression models, improving student comprehension scores by 20% based on course evaluations.

Research Assistant *Sep. 2023 – May 2024*

- Enhanced the Payoff-Based Learning Algorithm's efficiency by 25% on simulated multi-agent environments with 1,000+ game iterations in Prof. Lacra Pavel's Research Group
- Authored a thesis on Multiagent Finite Games Learning, extending Gao's reinforcement learning model to discrete-time settings, demonstrating 15% faster convergence using novel state-space adjustments.

Walmart **Toronto, ON**
Machine Learning Engineer *May 2022 - Aug 2023*

- Led a cross-functional initiative to optimize promotion efficiency using AWS-based ML models (TensorFlow, XGBoost), reducing manual vendor communication by 50 hours per month, increasing campaign ROI by 18%.
- Developed ETL pipelines and C++ automation tools, integrating Tableau with legacy systems, enabling 300+ analysts to access real-time data, cutting data retrieval time by 70%.
- Implemented AES-256 encryption and OAuth-based access control in APIs and ML pipelines, ensuring compliance with SOC 2 Type II security standards for secure data handling of 10M+ transactions/month.

Max-Planck Institute **Hamburg, Germany**
Software Developer *May 2021 — Aug. 2023*

- Designed a cloud-based GUI tool enabling 500+ students and faculty to remotely access University of Hamburg & Max Planck Institute servers, facilitating virtual experiments during COVID, reducing setup times by 60%.
- Developed protocol buffers for real-time data transfer reducing latency by 40% in high-volume network simulations.
- Integrated Azure SQL cloud into a server system, managing 10,000+ connections, reducing execution time by 35%.

Projects

Optimizing Operation Room Scheduling Sunnybrook Trauma | *Paper* Sep. 2023 - May 2024

- Developed a Deep Learning model for Sunnybrook Trauma, integrating LSTMs, SARIMA, and Neural Prophet predicting hourly trauma volume, achieving 90% accuracy on a 500,000+ case dataset, aiding resource allocation.
- Designed a PostgreSQL-based data pipeline, processing real-time trauma logs from 10+ hospital departments, reducing data retrieval latency by 40% and enabling 90% accurate trauma forecasts within 4 hours.

Adaptive Mechanical Stage Diagnostics Tool | *Paper* Sep. 2022 - May 2023

- Engineered a CNN-based malaria detection tool, integrating it with an adaptive microscopy stage, reducing manual diagnosis time by 60%, and achieving 94% accuracy on a 50,000-image malaria dataset.
- Leveraged Keras and TensorFlow for model training, implementing transfer learning techniques that reduced error rates by 30%, leading to real-time malaria detection in under 2 seconds per image.

Technical Skills

Languages: Python , C++ , Java , SQL , C
Frameworks:TensorFlow, Kera, PyTorch, scikit-learn, Pandas, Numpy, OpenCV, Matplotlib, pytest, AWS, Azure, DynamoDB, PostgreSQL, MySQL, Git, GitHub, Jira, Heroku, Bash, Unix, Power BI, Tableau, Node.js