

# Manpreet Singh

AI Engineer

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📍 Canada

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## Summary

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Results-driven AI/ML Engineer with **5+ years of experience** in deep learning and NLP. Proven track record of developing production-scale AI systems with measurable impacts, including 25% productivity improvement through AI automation. Combines hands-on industry experience with advanced research in transformer model interpretability at Dalhousie University.

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## Education

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### Master of Computer Science

Jan 2023 – Dec 2024

Dalhousie University – Halifax, NS, Canada

*Core courses – Machine Learning, Deep Learning, Natural Language Processing and ML for Software Engineering Applications.*

GPA (Graduate courses) – 3.9/4.3

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## Professional Experience

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### Research Assistant

May 2023 – Dec 2024

Hypermatrix Labs, Dalhousie University – Halifax, NS, Canada

#### Interpreting the effects of Quantization on LLMs

- Conducted first of kind research by investigating 2 Large Language Models (LLMs) across **3 quantization settings**, analyzing its impact on model confidence and calibration.
- Focused further research on neuron behavior by analyzing redundancy, dead neurons and overall contribution.
- Utilized **Integrated Gradients** to identify and analyze **1000+** salient neurons driving model predictions, measuring the effect on overall neurons contribution for model prediction.
- Developed an approach prompting open-source LLM to generate human-readable explanations for patterns learned by individual neurons, achieving a **10% cost reduction** in explanation validation through pattern simulation with a separate LLM.
- Proved utilization of quantization techniques to be reliable in high-risk and resource-constraint environments.
- Published findings in a thesis, contributing to the growing body of research on LLM transparency and explainability.

#### Manifold Learning in NLP Embeddings

- Evaluated **5+ manifold learning techniques** for dimensionality reduction of NLP token embeddings.
- Visualized and analyzed embedding spaces to identify model-learned biases.
- Delivered actionable insights on algorithm performance, enabling more equitable and unbiased NLP model training pipelines.

### AI Engineer

Jul 2019 – Oct 2022

iGnite Labs, Tata Consultancy Services – Chennai, India

- Developed Natural Language to SQL converter using GPT-3, processing 500+ queries daily with 92% accuracy.

- Built Rasa-powered NLP chatbot handling 1000+ daily developer queries, improving productivity by 25%.
- Created Computer Vision system converting 2D blueprints to 3D models, reducing visualization time by 60%.
- Mentored 100+ junior engineers, achieving 95% training completion rate.
- Ranked top 5 among 1000 trainees in AI/ML training program.
- Automated 15+ repetitive development tasks, saving 20+ hours weekly.

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## Key Skills

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- **Programming Languages:** Python, JavaScript, Java, and C.
- **Machine Learning & AI:** Pytorch, Supervised Learning, Unsupervised Learning, Deep Learning, Neural Network Interpretation, NLP, NLU, Explainable AI, Transformers, LLMs, Chatbot Development, Prompt Engineering, Computer Vision, GANs, CNN, TensorFlow, Keras, Scikit-learn, and Rasa.
- **Data Analysis:** Statistics, Pandas, Numpy, SQL, Matplotlib, Seaborn, and EDA.
- **High Performance Computing:** Cluster management (Slurm), Multicore optimization.
- **Software Development & DevOps:** Git, Docker, RESTful APIs, Flask, and Django.
- **Management & Leadership:** Team Lead, Agile, Mentoring and Project Management.

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## Certifications

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- [Getting Started with Deep Learning - Nvidia](#) | [LLMOps](#)

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## Extracurricular Achievements

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- Presented Neural Style Transfer project to India's Education Minister at iGnite Labs, TCS.
- First place winner, Plasma Quiz L.K. College, Jalandhar.
- Completed 20-week intensive AI/ML training (Top 0.5% among 1000 participants).

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## Reference

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References available upon request.