

EMRUL HASAN

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PROFILE

Ph.D. in Computer Science specializing in recommendation systems and NLP, with 6+ years of hands-on experience in Python, PyTorch, and applied machine learning. Experienced in large language models (LLMs), agentic AI, and responsible AI, with a strong record of designing, prototyping, and evaluating AI systems for both research and real-world applications.

EDUCATION

Ph.D. in Computer Science/AI, Toronto Metropolitan University, Toronto (4.13/4.33) Jan 2021 – Jan 2026

Graduate Courses: Machine Learning, Deep Learning, Advanced Natural Language Processing, and Software Engineering

Certificate Courses: LLM Application with LangChain and LLM Evaluation, Amazon University

TECHNICAL SKILLS

Languages & Frameworks: Python, PyTorch, Hugging Face, LangChain, LangGraph

Platforms & Tools: AWS (SageMaker, Bedrock, EC2, S3), GCP

WORK HISTORY

Postdoctoral Research Fellow | University of British Columbia, Vancouver, BC March 2026-Present

- Developed an AI-powered cancer care navigation assistant for cancer patients, recommending personalized resources
- Designed and trained novel AI model for depression prediction from clinical documents
- Supervised multiple AI and NLP projects on mental health, guiding end-to-end development from data processing to model evaluation.

Agentic AI Technical Specialist | Vector Institute (Part-time Contract), Toronto Jan 2026-Present

Companies: First Principle, BroadSight AI, and Luxe Factor

- Developed a retrieval-augmented generation (RAG) pipelines using embeddings, elasticsearch, structured data, and web-based sources.
- Integrated LLM agents with external tools and APIs (search, databases, code execution, retrieval systems) to enable grounded, action-oriented responses.
- Designed agent evaluation methods measuring task success, reasoning quality, latency, and failure modes in production settings.
- Mentored and guided junior machine learning engineers, providing technical expertise and fostering a culture of continuous learning and development

Research Assistant | Toronto Metropolitan University, Toronto Jan 2021- Jan 2026

- Designed architecture and implemented advanced deep learning models (autoregressive sequence models) for recommendation systems, processed diverse data types for learning user behavior and item features
- Developed a novel multi-criteria recommendation framework leveraging advanced deep learning and NLP methods to enhance recommendation accuracy
- Trained and optimized machine learning models through systematic experimentation with diverse architectures, feature engineering, and hyperparameter tuning, achieving significant performance gain
- Fine-tuned transformer models (e.g., BERT) for fake news classification, improving contextual understanding of misleading content.
- Researched, prototyped, and developed generative AI applications by integrating non-deterministic LLMs with structured, deterministic reasoning and evaluation frameworks.

Applied Scientist II Intern | Amazon, Vancouver June 2025 - Sept 2025

- Contributed to the development of an end-to-end automated evaluation framework for RAG system focusing on both retrieval accuracy and generation quality

- Developed reusable prompt templates incorporating few-shot, zero-shot, and hybrid prompting strategies for evaluating technical accuracy and conversation quality in multi-turn scenarios.
- Designed and implemented LLM-as-Judge and LLM-as-Jury evaluation frameworks to assess response quality, faithfulness, and task completion in LLM-based systems.
- Provided actionable recommendation based on the insights gained from the evaluation, improving the contact deflection rate by 2% and reducing manual evaluation time by approximately four weeks
- Designed and implemented python-based proof-of-concepts with reusable, modular architectures, reducing iteration time and enabling seamless transition from research prototypes to production-ready systems.
- Contributed to the development of an Agentic AI system (e.g. personal assistant) that automatically produced preparatory briefs for business leaders ahead of corporate meetings.

Machine Learning Technical Specialist | Vector Institute, Toronto

Sept 2024- April 2025

- Provided supervision to Machine Learning Associates (MLA) on end to end AI application development for various start-ups including RAG system, AI agent, and probabilistics prediction model.
- Evaluated and refined proof-of-concept proposals, providing technical recommendations that accelerated approval across partner organizations
- Provided weekly hands-on training sessions for MLAs on essential technologies, including ReAct agents, LangFuse, and RAG systems, aligned with company-specific use cases
- Collaborated with cross-functional teams to deliver secure, reliable, and efficient AI solutions that address evolving customer needs.

Applied Machine Learning Intern | Vector Institute, Toronto

May 2024- Aug 2024

- Applied advanced multimodal LLMs to annotate news articles, creating a novel bias-detection dataset and establishing benchmarks towards responsible AI.
- Developed structured prompt template (system, role, and task decomposition) to reduce hallucinations and improve reasoning quality in LLM outputs.
- Fine-tuned LLMs and VLMs with the novel dataset, establishing a benchmark for news-media-bias.
- Applied LLM-as-Judge evaluation techniques to assess the performance of the model output.

PUBLICATIONS (*Google Scholar Link: <https://scholar.google.com/citations?user=ZZFYZT0AAAAJ&hl=en>*)

- **Emrul Hasan**, Rahman, M., Ding, C., Huang, J., & Raza, S. (2024). Review-Based recommendation systems: a survey of approaches, challenges and future perspectives. *ACM Computing Surveys*. **(Ranked 1/143, Impact Factor 23.8)**
- **Emrul Hasan**, Ding, C., (2025). Contrastive Learning for Aspect Representation towards Explainable Recommendation. The 24th IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology, 2025 **(Accepted, received best student paper award)**
- Shaina Raza, Caesar Saleh, **Emrul Hasan**, Franklin Ogidi, Maximus Powers, Veronica Chatrath, Marcelo Lotif, Roya Javadi, Anam Zahid, Vahid Reza Khazaie. ViLBias: A Framework for Bias Detection using Linguistic and Visual Cues, arXiv, 2024 (under review)
- **Emrul Hasan**, Chen Ding, Sajib Saha, Neelima Monjusha Preeti, and Abdul Halim, Accommodation Review Ranking for Tourism Recommendation, Workshop on Recommenders in Tourism (RecTour 2024), October 18th, 2024, co-located with the 18th ACM Conference on Recommender Systems, Bari, Italy.
- **Emrul Hasan**, Chen Ding. Multicriteria Recommendation System by Leveraging Predefined, Implicit, and Undefined Criteria, ASONAM 2024
- **Emrul Hasan**, Chen Ding. *Criteria Rating Prediction with Aspect Representation Learning for Multi-criteria Recommendation*, The 22nd IEEE/WIC International Conference on Web Intelligence and Intelligent Agent Technology, 2023
- **Emrul Hasan**, Chen Ding, and C. Alfredo. *Multicriteria rating and review-based recommendation model*, Proceedings of the 22 IEEE International Conference on Big Data, 2022
- **Emrul Hasan**, and Byron Southern. *Monte Carlo Study of a Geometrically Frustrated Magnetic Compound: SrGd₂O₄*, Phys. Rev. B 96: 094407, 2017

VISA STATUS: Citizen of Canada, and TN Visa for USA