Meghana Bhange

https://github.com/meghanabhange Email Id: meghanabhange13@gmail.com
www.meghanabhange.com Google Scholar

Education

- **École de technologie supérieure (ÉTS)** Montréal, Canada
  Master's in Information Technology Engineering *May 2023 – April 2025*
  - Thesis: **Privacy Preserving Complaint Resolution System** supervised by Prof. Ulrich Aivodji and co-supervised by Prof. Jean-Marc Robert.
  - Completed selected courses under the Quebec Inter-University Transfer Agreement (AEHE-IUT): COMP 6721 Applied Artificial Intelligence (Summer 2023, Concordia University), COMP 547 Cryptography and Data Security (Fall 2023, McGill University), ECSE 557 Introduction to Ethics of Intelligent Systems (Fall 2024, McGill University)

- **Cummins College of Engineering for Women** Pune, India
  B.Tech. in Electronics and Telecommunication Engineering (ENTC) *Aug 2016 – Jul 2020*
  - Completed Electronics and Telecommunication courses with advanced elective courses in Information Theory, Communication Theory, and Intellectual Property Rights (IPR).
  - Founded and served as Head Coordinator of the Artificial Intelligence and Computer Vision club (AICVS), organizing workshops and seminars.

Research Experience

- **Mila - Quebec AI Institute** Montréal, Canada
  HQP - Master's Research *Sept 2024 – Present*
  - Research on Deep Learning, Information Theory, and Natural Language Processing.
  - Supervised by Prof. Ulrich Aivodji (Main) and Dr. Samira Ebrahimi Kahou (Co-supervisor).

- **École de technologie supérieure (ÉTS)** Montréal, Canada
  Master's Researcher *May 2023 – Present*
  - **Thesis**: Developed a **Privacy Preserving Complaint Resolution System** as part of a Master's thesis, supervised by Prof. Ulrich Aivodji and co-supervised by Prof. Jean-Marc Robert. The system leverages cryptographic protocols and Privacy-Enhancing Technologies (PETs) such as Attribute-Based Credentials (ABCs) to ensure anonymity, pseudonymity, and accountability in complaint reporting.
  - **Key Research Areas**: Anonymity, pseudonymity, complaint management systems, cryptographic security, Privacy-Enhancing Technologies (PETs), Attribute-Based Credentials (ABCs).

- **TISL Lab at ÉTS Montréal** Fully remote
  Affiliated Researcher *June 2022 – Present*
  - Researching model extraction attacks on Machine Learning systems with counterfactual explanation APIs.
  - Modelling adversaries leveraging counterfactual explanations for high-fidelity model extraction attacks.

Work Experience

- **Toptal** Part-Time Remote
  Freelance Machine Learning Engineer *Jan 2023 – Present*
  - **Freelance NLP Specialist at UInclude. Inc (2023 - Present)**: Developed and deployed a biased word matching model and synonym enricher using SpaCy, GPT-3/GPT-4, and FastAPI on AWS.
  - **Freelance ML Engineer for Denaro Capital Partners L.P. (2024 - Present)**: Developed automated trading platform using Technical Indicators and Optimisation Algorithms.

- **Hunters Security** Fully remote
  Machine Learning Engineer *Sept 2021 – Oct 2022*
  - Researched and built analytical tools for evaluating threat-hunting detectors and understanding anomalous patterns.

- Created ETLs for analyzing data from multiple sources like Snowflake and AWS RDS to run inference on detector performance.

- **Verloop.io** Bangalore, India
  Machine Learning Engineer *July 2020 – Sept 2021*
  - Improved intent recognition service using sentence-transformer to enhance accuracy by 40%.
  - Designed and deployed a multi-lingual Name Recognition service used across clients.

- **Verloop.io** Bangalore, India
  Machine Learning Intern *May. 2019 - August. 2019*
  - Created a Person-Name extractor customized for multilingual conversations using Flair (Facebook's NLP library) for English, Spanish, and French.
  - Presented work at PyData Bangalore Meetup with a talk on extracting names from multilingual conversation

Publications

- HinglishNLP: Fine-tuned Language Models for Hinglish Sentiment Detection, International Workshop on Semantic Evaluation 2020, Barcelona, Spain, Dec 2020.
- Long-range and Self-powered IoT Devices for Agriculture and Aquaponics, IEEE World Forum on Internet of Things (WF-IoT 2019), Limerick, Ireland, Apr 2019.
- Design, Development and Deployment of Low-Cost Short-Range Self-Powered Wireless IoT Devices, IEEE International Symposium on Smart Electronic Systems (iSES), Hyderabad, India, 2018.

Awards and Honors

- **École de Technologie Supérieure (ÉTS) Tuition Fee Exemption**: Selected for exemption from additional tuition fees for international students, Summer 2024 granted by the Ministry of Higher Education, Quebec.
- **Kaggle AI Report 2023**: Awarded Top Essay in AI ethics for the essay "Exploring the landscape of AI Ethics."
- **UN PET Lab's Hackathon 2022**: Awarded Best All-Female Team for hackathon on Privacy Enhancing Technologies using differential privacy techniques.
- **Toptal Hackathon 2022**: Awarded Second Prize for using Stable Diffusion to create an AI-assisted Cards Against Humanity game.

Programming Skills

- **Deep Learning Frameworks**: Proficient in PyTorch, Keras, fastAI for neural networks and deep learning models.
- **Natural Language Processing**: Experienced with spaCy, NLTK, Hugging Face for NLP tasks like NER and sentiment analysis.
- **Model Deployment & MLOps**: Skilled in Kubernetes, Docker, Flask, FastAPI for model deployment on AWS and other platforms.
- **Data Engineering**: Built data pipelines using SQL, Snowflake, and AWS RDS for large-scale data processing.
- **Automation & Optimization**: Experienced with Backtrader and optimization algorithms for automated trading systems.

Research Skills

- **Privacy-Preserving Systems**: Developed a privacy-preserving complaint system using PETs and cryptography in thesis work.
- **Adversarial ML**: Researching model extraction attacks using counterfactual explanations for secure environments.
- **Privacy-Preserving Tech**: Worked on differential privacy techniques in privacy-focused projects and hackathons.
- **Natural Language Processing**: Research in multilingual NLP applications, bias detection, and Hinglish sentiment analysis.
- **Deep Learning Research**: Built and optimized neural networks for NLP and vision tasks using cutting-edge methods.
- **Collaboration**: Worked with academia and industry on NLP ethics and privacy-preserving technologies.