Ibrahim Mohammed Sayem

Toronto, ON, Canada (+1)519-8515434
ibrahim.sayem@mcgill.ca Website Google Scholar LinkedIn GitHub

RESEARCH INTEREST

I study the intersection of machine learning (ML) with security and privacy, focusing on ML security and trustworthiness, differential privacy, optimization of ML systems, data security, and responsible AI system development. I also investigate security challenges in software systems that integrate Large Language Models (LLMs), including vulnerabilities in LLM-generated code to build secure and trustworthy AI-driven software engineering workflows.

EDUCATION

University of Western Ontario ***January 2021 – August 2022***
M.Sc in Computer Science (Thesis-based), GPA: 4.00 out of 4.00 *London, Ontario, Canada*

University of Chittagong ***January 2013 – October 2018***
B.Sc in Computer Science and Engineering, CGPA: 3.60 out of 4.00 *Chittagong, Bangladesh*

RESEARCH EXPERIENCE

McGill University **January 2025 – Present**
Research Assistant II *Montreal, Quebec, Canada*

- **Detecting Hallucinations in AI-Assisted Code Generation** : Analyzing AI-driven code generation pipelines with Professor Jessie Galasso-Carbonnel at McGill University, focusing on identifying vulnerabilities in LLM-generated code by examining cross-domain AI workflows and detecting security-relevant hallucinations and inconsistencies in model-produced code.

University of Western Ontario **January 2021 – December 2022**
Graduate Research Assistant *London, Ontario, Canada*

Worked in AI-based cyber-security and 5G traffic forecasting projects in the WING LAB led by Dr. Anwar Haque.

- **WING5GQoS** : 5G QoS Data Collection and Forecasting Tool *(5G, QoS, Time-series Forecasting)*
  We partnered with **Bell Canada** to develop WING5GQoS, a 5G QoS data collection and forecasting tool. Using a file-sharing strategy, we gathered key QoS metrics and applied data windowing to forecast throughput and latency with 87.89% accuracy. Deep models like LSTM and LSTM encoder-decoder were used to optimize resource utilization. We are now in the process of commercializing this tool.
- **ENIDS** : Ensemble Network Intrusion Detection System *(Security, Deep Learning, Ensemble Approach)*
  We utilized two network traffic datasets, applied optimal feature selection, and addressed class imbalance using SMOTE+ENN. We proposed an ensemble model with CNN, LSTM, and GRU in the first layer, followed by a DNN, achieving 90.4% and 99.6% accuracy on UNSW-15 and CICIDS-2017 datasets, respectively, while reducing attack detection time by 30%. This work was published in IWCMC-2022, and IEEE TNSM-2024.

University of Chittagong **June 2017 – October 2020**
Undergrad Research Assistant *Chittagong, Bangladesh*

- Developed IoT-based Security Camera and ML-based Credit Card Fraud Detection. Published in iCMLDE 2018, and 2019 respectively.

ACCOMPLISHMENTS and AWARDS

Research Fellowship (Research Assistant 2) **February 2025 – Present**
Department of Electrical and Computer Engineering, McGill University ($22,500 CAD)

Western Graduate Research Scholarship (WGRS) **January 2021 – April 2022**
Department of Computer Science, Western University ($14,200 CAD)

Employee of the Year Award **2019**
Rankmylist Bangladesh Ltd. ($500 CAD)

National Science and Technology (NST) Fellowship **2017 - 2018**
Ministry of ICT, Government of Bangladesh ($700 CAD)

University Merit Scholarship **2015 - 2018**
University of Chittagong ($250 CAD)

PROFESSIONAL EXPERIENCE

Community of Guardians **April 2023 – December 2023**
Full Stack Developer(Full-time) *London, ON*

- **Responsibilities:** Ensured a robust user experience and seamless user experience by developing and maintaining web applications using front-end and back-end technologies. Collaborated with cross-functional teams to develop, execute, and optimize scalable solutions.
- **Tech stack:** Node.js, Express.js, React.js, HTML, PostgreSQL, Tailwind, CI/CD, Jira, GitHub

Rankmylist Bangladesh Ltd. **Dec 2018 – January 2020**
Web and Mobile Application Developer (Full-time) *Chittagong, Bangladesh*

- **Interactive Ranking Module:** Created a core ranking module for rankmylist, performed query optimization, contributed to the design of the system for efficient data storage, and developed a core ranking module and automated data visualization using D3.js. Designed an optimized algorithm to show advertisements based on customer's needs.
- **Tech stack:** Vanilla JavaScript, PHP, d3.js, MySQL, CSS, HTML, Python, BitBucket.

PUBLICATIONS

- [Computers in Biology and Medicine] Rahaman, S., Wang, P., Yu, J., Rahman, T., Toseef, M., ***Sayem, I. M.**, ... Wong, K. C. (2025). Precision oncology informatics for anticancer drug combination responses: A systematic review. Computers in Biology and Medicine, 196, 110788.
- [ACM CCSW-24] Sabbir M. Saleh, ***Ibrahim Mohammed Sayem**, Nazim Madhavji, and John Steinbacher. 2024. Advancing Software Security and Reliability in Cloud Platforms through AI-based Anomaly Detection. In Proceedings of the 2024 on Cloud Computing Security Workshop (CCSW '24). Association for Computing Machinery, New York, NY, USA, 43–52.
- [IEEE TNSM-2024] ***I. Mohammed Sayem**, M. Islam Sayed, S. Saha and A. Haque, ENIDS: A Deep Learning-Based Ensemble Framework for Network Intrusion Detection Systems, in IEEE Transactions on Network and Service Management, vol. 21, no. 5, pp. 5809-5825, Oct. 2024.
- [MSc Thesis] ***Sayem, Ibrahim Mohammed**, Exploring Artificial Intelligence (AI) Techniques for Forecasting Network Traffic: Network QoS and Security Perspectives (2022). Electronic Thesis and Dissertation Repository. 8861. https://ir.lib.uwo.ca/etd/8861
- [IWCMC-2022] M. I. Sayed, ***I. M. Sayem**, S. Saha and A. Haque, A Multi-Classifier for DDoS Attacks Using Stacking Ensemble Deep Neural Network, 2022 International Wireless Communications and Mobile Computing (IWCMC), Dubrovnik, Croatia, 2022, pp. 1125-1130.
- [iCMLDE-2019] A. H. Nadim, ***I. M. Sayem**, A. Mutsuddy and M. S. Chowdhury, Analysis of Machine Learning Techniques for Credit Card Fraud Detection, 2019 International Conference on Machine Learning and Data Engineering (iCMLDE), Taipei, Taiwan, 2019, pp. 42-47.
- [iCMLDE-2018] ***I. M. Sayem** and M. S. Chowdhury, Integrating Face Recognition Security System with the Internet of Things, 2018 International Conference on Machine Learning and Data Engineering (iCMLDE), Sydney, NSW, Australia, 2018, pp. 14-18.

SELECTED TALKS AND PRESENTATIONS

- Advancing Software Security and Reliability in Cloud Platforms through AI-based Anomaly Detection.
  Conference presentations [Virtual], ACM CCSW'24, October 2024
- Integrating Face Recognition Security System with the Internet of Things
  Conference presentations [virtual], iCMLDE 2018

TEACHING EXPERIENCE

Humber Polytechnic **January 2024 – Present**
Sessional Faculty *Toronto, Ontario, Canada*

As a Sessional faculty, I was responsible for delivering lectures, mentoring students, contributing to curriculum development, participating in committees, and promoting an inclusive academic environment. I delivered lectures on the following subjects:

- CPAN-133-Operating system, Winter 2024/2025
- ITE-5230-Application Development using .Net, Winter 2024/2025
- ITE-5231-Data Structure ad Design Patterns, Summer/Winter 2024

- CPAN-212-Modern Web Technologies, Fall/Winter 2024
- CPAN-226-Network Programming, Summer/Winter 2024/2025
- CPAN-116-Algorithms & Problem Solving, Fall/Winter/Summer 2024

Fanshawe College **September 2024 – December 2024**
Adjunct Professor *London, Ontario, Canada*
- INFO-6070-Network Security, Fall 2024

Seneca Polytechnic **September 2023 – December 2023**
Adjunct Professor *Toronto, Ontario, Canada*
- DSA456-Data Structure and Algorithms, Fall 2023
- BTN710-Information Security, Fall 2023

University of Western Ontario **January 2021 – April 2022**
Graduate Teaching Assistant *London, Ontario, Canada*
Assisted professors in delivering lectures, conducting lab sessions, and grading assignments and exams with constructive feedback. Performed TA duties for the following undergraduate courses:

- COMPSCI-1027B Computer Science Fundamentals II, Winter 2021
- COMPSCI-2210B Data Structures and Algorithms, Fall 2021
- COMPSCI-1027B Computer Science Fundamentals II, Winter 2022

International Islamic University, Chittagong **November 2018 – December 2020**
Adjunct Faculty *Chittagong, Bangladesh*
- CSE-4827 Computer Simulation and Modeling, Spring 2018/2019
- CSE-3527 Compiler Design, Autumn 2019
- CSE-3637 & CSE-3638 Software Engineering and Lab, Autumn 2018/2019
- CSE-2423 & CSE-2424 Database Management System and Lab, Spring 2019
- CSE-2321 Data Structure and Algorithms, Spring 2020

VOLUNTEER EXPERIENCE

Reviewer **October 2024 – Present**
IEEE Transactions on Network and Service Management (TNSM)

Reviewer **November 2025 – Present**
Journal of Electronic Science and Technology (JEST)

LEADERSHIP and ATTRIBUTES

- Team member for the Organizing Committee of UWORCS 2021.
- Volunteered for the 2021 "Bit by Bit" Summer Camp, where I taught basic programming concepts to school students.
- Organized CU Inter-University programming contest in 2016.
- Organizing member of the Golden Jubilee celebration of the University of Chittagong in 2015.

TECHNICAL SKILLS

- **Programming**: Python, JavaScript, C++, Java, R
- **Machine Learning**: Scikit-Learn, Pandas, Matplotlib, Numpy, Weka, NLTK, Gensim
- **Deep Learning**: TensorFlow, PyTorch, Keras, OpenCV
- **Web Frameworks**: Node.js, React.js, Django, Flask, Redux, GraphQL
- **Tools**: MySQL, MongoDB, Git, AWS, ElasticSearch, Azure, Terraform, CI/CD, Airflow, Docker

REFERENCES

- Dr. Anwar Haque, Associate Professor, Computer Science, University of Western Ontario
  ahaque32@uwo.ca
- Dr. Mohammad Sanaullah Chowdhury, Professor, Computer Science & Engineering, University of Chittagong
  s.chowdhury@cu.ac.bd
- Dr. Sajal Saha, Assistant Professor, Computer Science, University of Northern British Columbia
  sajal.saha@unbc.ca