Ibrahim Mohammed Sayem

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RESEARCH INTEREST

My research interests focus on Machine Learning (ML), System Security & Privacy, Software Engineering, NLP, Gen AI (LLMs), ML Safety & Privacy, Data Security & Privacy, Trusted Execution Environments (TEEs), Network security/safety, and Genomic Algorithms.

EDUCATION

University of Western Ontario ***January 2021 – December 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

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

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

- **WING5GQoS** : 5G QoS Data Collection and Forecasting Tool [under embargo] *(5G, QoS, Time-series Forecasting)*

  We Worked closely with the **Bell Canada** technical team in developing WING5GQoS a 5G Quality of Service (QoS) data collection and forecasting tool. We employed a file-sharing strategy with different traffic loads to collect QoS data utilizing a high-speed server and **proposed a dataset with four different QoS metrics of the 5G network.** The collected data was pre-processed, **transformed using the data windowing technique**, and **forecasted throughput and latency for three different day parts with 87.89% accuracy** using various deep sequences models, such as LSTM and LSTM encoder-decoder, **resolving resource utilization issues. This project is part of the Bell-Western 5G research program.**

- **ENIDS** : Ensemble Network Intrusion Detection System *(Security, Deep Learning, Ensemble Approach)*

  We utilized two popular network traffic datasets, extensively pre-processed the data with optimal feature selection, and solved the **imbalance classification problems using the data resampling technique SMOTE + ENN.** Proposed an **Ensemble model** where CNN, LSTM, and GRU were used in the first layer, and the **training weights of the first layer were concatenated with DNN in the second layer**, which can detect 11 different types of cyberattacks with **improved accuracy of 90.4% and 99.6% for the UNSW-15 and CICIDS-2017 datasets and reduce attack detection time by 30%.**

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

- **IoT based Security Camera** : Detects unauthorized access from real-time video streaming *(Python, OpenCV, Raspberry pi)*

  Used **Image pre-processing, Face Detection, Feature Extraction** and train classifier model and used **LBPH** object classifier to detect real-time face from live stream video and used **Machine-Learning** to predict the image and if the image is not in the authorized list the system will send an email notification.

TEACHING EXPERIENCE

Humber College **January 2024 – Present**
Instructor *Toronto, Ontario, Canada*

- CPAN-133-Operating system, Winter 2024
- ITE-5230-Application Development using .Net, Winter 2024
- ITE-5231-Data Structure and Design Patterns, Summer/Winter 2024
- CPAN-212-Modern Web Technologies, Winter 2024
- CPAN-226-Network Programming, Summer/Winter 2024

- CPAN-116-Algorithms & Problem Solving, Winter/Summer 2024

Seneca Polytechnic **May 2023 – December 2023**
Adjunct Professor *Toronto, Ontario, Canada*

- BTP100-Programming Fundamentals Using C, Summer 2023
- BTD315-Advanced Database Technologies, Summer 2023
- DSA456-Data Structure and Algorithms, Fall 2023
- BTN710-Information Security, Fall 2023

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

- COMPSCI-1027B Computer Science Fundamentals II, Winter 2021
- COMPSCI-2210B Data Structures and Algorithms, Fall 2021
- COMPSCI-1027B Computer Science Fundamentals II, Winter 2022
- COMPSCI-4457A Computer Networks II, Fall 2022

International Islamic University, Chittagong **November 2018 – December 2020**
Adjunct Faculty *Chittagong, Bangladesh*

- CSE-4827 Computer Simulation and Modeling, Spring 2018
- CSE-3527 Compiler Design, Autumn 2019
- CSE-3637 & CSE-3638 Software Engineering and Lab, Autumn 2019
- CSE-4832 Computer Networks I, Spring 2019
- CSE-2423 & CSE-2424 Database Management system and Lab, Spring 2019
- CSE-2321 Data Structure and Algorithms, Spring 2020
- CSE-3631 Operating Systems, Autumn 2020

PROFESSIONAL EXPERIENCE

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

- **Responsibilities:** Manage IT operations to ensure the best functionality and alignment with company strategy. To improve IT practices and operations, develop and implement policies and procedures. Find and solve technology-related risks, problems, and opportunities; put good solutions in place. Develop partnerships with vendors, oversee IT budgets, enhance system performance, and guarantee legal compliance.
- **Tech stack:** Node.js, Express.js, React.js, HTML, PostgreSQL, Tailwind, CI/CD, Jira, GitHub

Rankmylist Bangladesh Ltd. **Dec 2018 – April 2020**
Web and Mobile Application Developer *Chittagong, Bangladesh*

- **Interactive Ranking Module:** Created a core ranking module for rankmylist website and Created automated data visualization charts to draw insights from submitted rankings based on **interactive visualization using d3.js**. **utilized MySQL and improved database query performance through proper indexing**. provided various levels of customer support for database entry and manipulation queries. Contributed to system design planning, providing insights regarding efficient data storage.
- **Tech stack:** Vanilla JavaScript, PHP, d3.js, MySQL, CSS, HTML, Python, BitBucket.

PUBLICATIONS

- Advancing Software Security and Reliability in Cloud Platforms through AI-based Anomaly Detection, **ACM CCSW, CR: A1**, 2024. [Accepted]
- ENIDS: A Deep Learning Based Ensemble Framework for Network Intrusion Detection System, **IEEE TNSM, IF: 5.3**, 2024.
- WING5GQoS: QoS Performance Analyzer Tool and Pattern Prediction Using Artificial Intelligence (AI), **currently embargo**, 2024.
- Exploring Artificial Intelligence (AI) Techniques for Forecasting Network Traffic: Network QoS and Security Perspectives, **Master's Thesis**, 2022.
- A Multi-Classifier for DDoS Attacks Using Stacking Ensemble Deep Neural Network, **IEEE IWCMC, CR: A2**, 2022.
- Analysis of machine learning techniques for credit card fraud detection, **Google Scholar**, 2019.
- Integrating Face Recognition Security System with the Internet of Things, **Google Scholar**, 2018.

PROJECTS

- **Illegally parked vehicle detection** : Detects illegally parked vehicles from real-time video Streaming *(Python, OpenCV)*Used **background subtraction, shadow, noise removal, centroid techniques** to extract static objects from videos and applied **Haar-cascade** object classifier to detect real-time illegally parked vehicles. Used, CNN, MRCNN, and LSTM Algorithms for the Model Development
- **Phone Book Manager(Andriod Project)** : Add number, email, location, along with image *(Java and SQLite)*
- **University Hall Management System** : Managing Hall which helps students and authority to save the records of the students
  about their rooms and other things. *(PHP, HTML, JavaScript, MySQL and CSS)*
- **Discussion Forum** : A Forum that allows all the members of the Organization to hold discussions online. *(Laravel)*

ACCOMPLISHMENTS and AWARDS

- Secured the third position in UWORCS 2022 for the Traffic Forecasting project.
- WGRS(Western Graduate Research Scholarship); awarded by Western University, for research.
- Productive employee award from Rankmylist Inc.
- NST Fellowship (2018); Awarded by the Ministry of Science and Technology, Government of Bangladesh, for undergrad thesis.
- Merit Based Government Scholarship (2018) for being the top 5 students in bachelor studies from the Department of Computer Science at the University of Chittagong.

TECHNICAL SKILLS

- **Languages**: **Python**, **Java**, C/C++, **JavaScript**, C#
- **Frameworks**: **Node.js**, Express.js, **React.js**, Next.js, Django, d3.js
- **Databases**: **SQL**, **MySQL**, **PostgreSQL**, MongoDB
- **DS and ML Tools**: Pandas, Numpy, Tensorflow, Scikit-Learn/Image, OpenCV, NLTK, spaCy, PyTorch, PIL
- **Tools**: **Git**, **Docker**, **AWS**, BitBucket, Azure, JIRA, GCP, Terraform, BigQuery, CI/CD, ETL, Airflow.
- **Deployments Tools**: NginX, Apache, Ansible, Docker, Jenkins, Linux

LEADERSHIP and ATTRIBUTES

- Team member for the Organizing Committee of UWORCS 2021
- Volunteer of the Bit by bit summer camp arranged for young students to teach idea and skills of IT
- Problem-Solving, Attention to Detail, Teamwork and collaboration, Time Management, Analytical Thinking, Continuous Learning, Adaptability, and Documentation.
- Organizing member of the Golden Jubilee celebration of the University of Chittagong in 2015.
- Organized CU Inter-University programming contest in 2016.

CERTIFICATIONS

- CISCO Networking Academy: Introduction to CyberSecurity.
- ML Observability Fundamentals Certification.
- Databases and SQL for Data Science with Python.
- Google Data Analytics Professional Certificate.
- NLP with Python for Machine Learning Essential Training.
- Fundamentals of Scalable Data Science.

REFERENCES

Available Upon Request