

Maisha Rahman Mim

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Research Interests

I am a self-motivated doctoral candidate driven by a deep love for **Security, Cryptography and Software Engineering**. I exhibit steadfast focus and determination to achieve my goals. I am determined to leverage my enthusiasm and work ethic to make significant contributions to my area of interest.

Education

Bangladesh University of Engineering and Technology

B.Sc in Computer Science and Engineering

March 2018 - May 2023

Dhaka, Bangladesh

- GPA: 3.68/4.0
- **Notable Courses:** Computer Security, Software Engineering, Machine Learning, Computer Architecture, Microprocessors, Microcontrollers & Embedded Systems, Computer Networks, High Performance Database Systems, Operating Systems, Graph Theory, Computer Graphics, Compiler, Simulation & Modelling

Skills

Programming Languages: C, C++, Java, Python, SQL, Flex, Bison, Assembly, Shell, Javascript, Html, Css

Frameworks: Spring, Django, Node.js, React.js, JavaFX, React-Native, Bootstrap

Database : Oracle, MongoDB, MySQL, PostgreSQL

Operating System: Windows, Linux (Ubuntu 20.04 & Kali)

Version control : Git

Others : Wireshark, Hibernate, JPA, NS3, OpenGL, Adobe Illustrator, Autocad, Github, Bitbucket

Research Experience

An Empirical Study of Code Smells in Transformer-based Code Generation Techniques

July 2022

ieeexplore.ieee.org

Transformer-based language learning models which automatically generate source code are trained with samples from open source projects which may not be free of security flaws, code smells, and violations of standard coding practices. We investigated to what extent code smells are present in the datasets and verified whether they leak into the output of these techniques. We used Pylint and Bandit to detect code smells and security smells in three widely used training sets (CodeXGlue, APPS, and Code Clippy). We observed that Pylint caught 264 code smell types, whereas Bandit located 44 security smell types in these three datasets used for training code generation techniques. By analyzing the output from ten different configurations of the open-source fine-tuned transformer-based parameters model, we observed that they leaked the smells and non-standard practices to the generated source code.

- **Field :** Security, Software Engineering
- **My Contributions :** Implemented a program which automatically downloads the datasets of LLMs and run Pylint and Bandit on them. Developed a python based parser which detects code smells and security violations using Regex.
- **Supervisor :** [Joanna C. S. Santos](#)

- **Co-Authors** : Mohammed Latif Siddiq, Shafayat Hossain Majumder, Sourov Jajodia

Blockchain in Healthcare - Efficiently Storing and Sharing Patient Health Data

Jan. 2023 to Current

The sharing of personal health records can be beneficial to diagnosis and medical research. Currently most of the health record schemes are fully dependent on third-party cloud service providers, which is not secure enough because there is a high risk of leaking confidential health data. Blockchain provides a better solution for storing and sharing data because of its decentralized and tamper-proof features. We proposed a new Blockchain-based personal healthcare data storage and sharing scheme. We used highly secure and efficient encryption-decryption mechanisms along with blockchain to tackle the risk of privacy disclosure.

Targeting to submit it in an upcoming conference.

- **Field** : Cryptography, Blockchain
- **My Contributions** : Generated the main idea of the sharing scheme. Also developed a mobile application for patients using React - Native.
- **Supervisor** : [Abu Sayed Md. Latiful Hoque](#)

Quantum Cryptography

May 2024 to Current

Currently working on quantum cryptography aiming to improve Quantum Key Distribution (QKD) Algorithms. Though we do not have anything significant yet, I am hoping that we will get a great outcome from our research.

- **Field** : Cryptography, Quantum Computing
- **Supervisor** : [M Sohel Rahman](#)

Industry Experience

Therap BD LTD Associate Software Engineer, Developer

June 2023 to Current
Dhaka, Bangladesh

- Therap provides Software as a Service (SaaS) to government and private organizations globally that serve people with intellectual and developmental disabilities.
- Currently working as a full stack developer.
- Worked on Personal finance account & Transaction for an individual (with intellectual and developmental disabilities) which maintains accounts and sends reports to state Governments and private organizations.
- Worked on Event Report which maintains different events happened to an individual like Injury, Medication Error, Restraint Related to Behaviour, Death etc and the actions taken by the agencies. These reports are sent to the state governments and organizations as pdf generated by the application.

Projects

Social Media - Instagram

[Bitbucket](#)

- Developed a social media platform like instagram where a user can upload image as a post. The users can watch the posts according to the privacy settings of a post in their home feed and like-comment. The users can search and follow/unfollow others. They can also get follow suggestions.
- **Stack**: Spring MVC, PostgreSQL, Hibernate, JPA, Html, Javascript

Travel Bug - A Travelling Website

[Github](#)

- Developed a website to make travelling easier. Here a user can host a travel experience like hiking, snorkling, scuba diving etc. And the travellers can search and book their preferred experiences according to budget, team size, duration etc. They can also pay fully or partially. Besides, there is travelling guideline module where a user can search for available transports providing source and destination locations on map. Then, the website will provide all possible transportation choices like direct/indirect, mixed etc with transportation costs.
- **Stack:** MongoDB, Express.js, React.js, Node.js, Bootstrap, Css

IOT Based Health Monitoring System

[Github](#)

- Developed a microcontroller-based health monitoring system. It can continuously monitor patient's health conditions such as body temperature, pulse and send this information to doctors and patients relatives via message. It will also automatically upload all information on the cloud through the WiFi module.
- **Hardware:** ATmega32, Arduino Uno, Wifi Module, GSM Module & Sensors

E-commerce Website

[Github](#)

- Developed a website where users can advertise and sell their products. Customers visiting the website can search and buy them. Different Organizations can post job openings and users can drop CV.
- **Stack:** Django, Oracle, Bootstrap, Javascript

Super Resolution of Images

[Github](#)

- Prior models to make image quality low to high were either very inefficient and slow or fast but has low output image quality. We introduced a model which generates high quality images faster, but compromising quality a little bit.
- ML, Pytorch, Numpy

Notable Course Works

CNN from Scratch [Github](#)

2023

- Python, Numpy
- A simple implementation of a Convolutional Neural Network (CNN) from scratch using only numpy. The network is trained on the NumtaDB dataset to recognize Bengali numerical digits.

Ray Tracing [Github](#)

2022

- OpenGL, C++
- This project is an implementation of image generation of 3D geometric shapes using ray tracing with appropriate illumination techniques with multilevel of reflections.

A Simple C Compiler [Github](#)

2021

- C++, YACC, Lex, Shell
- A simple compiler for the C language. It is a partial compiler which implements symbol table, a lexer, a parser, and a code generator.

Honors & Awards

vGHC 21 Scholarship: Scholarship granted to only a few selected candidates based on merit to attend the Grace Hopper Celebration of Women in stem, a conference that brings together women in tech from around the world.

Deans List Scholarship, BUET (2022-2023): Awarded for obtaining an average GPA of 3.75 or above in two consecutive terms.

Barishal Board General Scholarship (HSC): Scholarship granted for outstanding performance in the Higher Secondary School Certificate exam of Bangladesh.

Barishal Board General Scholarship (SSC): Scholarship granted for outstanding performance in the Secondary School Certificate exam of Bangladesh.

Barishal Board General Scholarship (JSC): Scholarship granted for outstanding performance in the Junior School Certificate exam of Bangladesh.

Barishal Board Talentpool Scholarship (PSC): Scholarship granted for outstanding performance in the Higher Secondary School Certificate exam of Bangladesh.

Achievements & Participations

1st Runners Up of Creative talent Hunt in Barguna District.

Top 30 in National Cyber Drill 2022 and University Cyber Drill 2022.

Top 40 in Flag Hunt CTF 2022 and Leetcon CTF 2022.

Champion of several Poem Recitation competitions in Bangla.

Champion of several Essay Writing competitions in Bangla.

Participated in **Microsoft Tech Resilience Mentorship Program**.

Participated in **HACK NSU Season 2** Hackathon.

Participated in **Math Olympiad** Bangladesh.

Leadership & Volunteer Experience

General Secretary, Bangladeshi Women In Computer Science & Engineering (BWCSE) [🔗](#) April 2022 to May 2023

Content Creator, Bangladeshi Women In Computer Science & Engineering (BWCSE) [🔗](#) April 2020 to April 2022

Campus Representative, Red and White Innovations [🔗](#) May 2020 to May 2021

Student Tutor & Mentor Jan 2018 to May 2022