Fahmid Al Rifat

Research Interests: Security and Privacy | HCI | Applied Machine Learning

+(880)-1774550000 | alrifatfahmid2@gmail.com | https://fahmidar.github.io/ | GitHub

PROFESSIONAL EXPERIENCE

United International University | *Lecturer* July 11, 2023 - Present

- As a Lecturer of Computer Science, I instruct courses including Data Structures and Algorithms, Engineering Ethics, Programming for Data Science, Object-Oriented Programming, and Digital Logic Design, among others. Apart from that, I also supervise student projects and coordinate university events.

Security and Software Engineering (S2E) lab | *Remote Research Collaborator* February, 2022 - July, 2023

- I conducted research on language models, exploring their applications in software security, prompt engineering, code generation, and code comment classification, while also contributing to three research projects. This experience greatly enhanced my understanding of effective research methodologies.

EDUCATION

Bangladesh University of Engineering and Technology March, 2017 - May, 2023
Bachelor of Science in Computer Science and Engineering CGPA (Majors) : 3.75/4.00
Department of Computer Science and Engineering CGPA (Last Year) : 3.91/4.00
Awarded Dean's List Scholarship, 2022–23 session CGPA (Actual) : 3.65/4.00

Dhaka Residential Model College February, 2015 - February, 2017
Higher Secondary Certificate (HSC), Graduated with High Honours in Science GPA: 5.00/5.00

Rangpur Zilla School February, 2013 - February, 2015
Secondary School Certificate (SSC), Graduated with High Honours in Science GPA: 5.00/5.00

PEER REVIEWED PUBLICATIONS

28th International Conference on Evaluation and Assessment in Software Engineering (EASE 2024) | **Link**
Using Large Language Models to Generate JUnit Tests: An Empirical Study
Automated unit test generation, GitHub Copilot

- Conducted empirical study on code generation models for automated unit test generation under **Professor Joanna C. S. Santos** at the University of Notre Dame, USA.
- Collaborated in the S2E lab, exploring generative models' capabilities for unit test generation. Enhanced skills in data preprocessing, generative models, and global research methodologies .
- Explored effectiveness of Codex, GPT-3.5-Turbo, and StarCoder.

Research Project Experience

Enhancing the RGB Image Selection Process Using Genetic Algorithms for Steganography | **Link**
Cybersecurity, Image Steganography, Genetic Algorithm, Optimal Method **2023 - 2024**

- Pursued the research project under the guidance of **Dr. M. Sohel Rahman**, Professor of Computer Science and Engineering at Bangladesh University of Engineering and Technology (BUET). The goal of the research was to develop an optimized pipeline utilizing genetic algorithms to select RGB cover images, thereby improving the security and robustness of image-based information-hiding methods.

Comprehensive Analysis and Detection of Interpersonal Rapport and Deception in VR Environments
Virtual Reality, Unity, Machine Learning, Psychology **2024 - Present**

- In collaboration with **Dr. M. Sohel Rahman**, this project focuses on detecting interpersonal rapport based on non-verbal cues, facial expressions, and group dynamics, providing valuable insights into improving communication and correlating it with lie detection in virtual settings .

Fairness Enhancement for MIMIC-IV Pipeline: A Novel Accessible Electronic Health Record Dataset
HCI, Fairness and Bias, Machine Learning, Health-Care **2024 - Present**

- This project, guided by **Dr. Tanzima Hashem**, focuses on mitigating bias in the MIMIC-IV healthcare dataset using mitigation approach by employing adversarial and transfer learning to enhance fairness without compromising data integrity, achieving better fairness and accuracy than traditional methods.

Static Analysis in Containerized Environments by Examining Various Security Tools and Methods.
Static Analysis, Containerized Environments, Vulnerabilities **2024 - Present**

- Collaborating with **Dr. Md. Shohrab Hossain**, to identify security vulnerabilities by combining static analysis methodologies in containerized environments by evaluating various static analysis tools and techniques, aiming to enhance and improve the detection of security gaps in containerized systems.

PROFESSIONAL PROJECTS

Icece Buet Website | *Laravel, CSS, PHP* May , 2022 | Website

- Led development and maintenance of a full-stack web application for the International Conference on Electrical and Computer Engineering.
- Acted as primary developer, implementing new modules, integrating a payment gateway, and overseeing ongoing maintenance and updates.

Raven-claws E-commerce Website Development | *Wordpress, CSS, PHP* November, 2020 | Website

- Developed a full-stack e-commerce web app for Raven-Claws Company, a well-known multi-purpose shop.
- Enhanced functionality with subscription-based reviews, sales and admin recommendations.

ACADEMIC PROJECTS

Dormitory management system | *Node.js ,React , MongoDB* May, 2022 | GitHub

A Node.js-based web application for efficient dormitory management, encompassing dining, room allocation, automation and various features benefiting students, provost, service personnel, and dining managers.

Hall management system | *Django , MongoDB* January, 2022 | GitHub

A web application for managing functionalities of a dormitory which helps student,provost,staffs to complete and keep track of dormitory related process easily under Dr. Md. Mostofa Akbar, CSE, BUET.

Defending Black Hole Attack | *Network Simulator 3(NS3) , C , Python , GNU-Plot* January, 2022 | GitHub

Improved AODV protocol in Network Simulator 3 to mitigate the impact of black hole attacks, supervised by Dr. Md. Shohrab Hossain.

Smart Cart | *C, Arduino, ATMega 32, Atmel Studio, Proteus 832* November, 2021 | YouTube

Our team developed a functional smart cart prototype with automatic collision detection and handling capability. Implemented through software simulation and small-scale hardware .

Travel Agency BD | *Django, Oracle SQL, HTML, CSS* November, 2021 | YouTube

Developed a web application for Travel Agency BD, providing tourism services with accommodation, travel packages and database development, under the guidance of Dr. Muhammad Abdullah Adnan, CSE, BUET.

Mili Militia Pro | *Java , JavaFx , Socket programming* November, 2020 | GitHub

Developed a server-client multiplayer adventure game under the supervision of Md. Tarikul Islam Papon, enabling users to create and join battle rooms with a variety of weapons.

NFS Kill Trone | *C++, iGraphics Custom Library* November, 2018 | YouTube

Under the supervision of Md. Shohrab Hossain, developed a graphical adventure game was developed utilizing a custom game engine which has been highly praised.

Other Projects

- **Digit Recognition with CNN** | *Python, C++* January, 2023 | GitHub
- **Code Comments Classifications NLP** | *Bert, Fast Text, Weka* January, 2023 | GitHub
- **Expectation Maximization Model** | *Python, C++* January, 2023 | GitHub
- **Hamiltonian Cycle Detection and Tree Decomposition** | *Python, C++* January, 2023 | GitHub
- **Rastering, Ray Tracing, and Antialiasing Pipeline** | *OpenGL, Python, C++* May, 2022 | GitHub
- **Cryptography Hybrid Model** | *Python, Socket Programming* May, 2022 | GitHub
- **Morris Worm** | *Python, C++* May, 2022 | GitHub
- **Memory Managing, Scheduling Feature in Xv6** | *MIT Xv6 Codebase* January, 2022 | GitHub
- **Mancala, Casper-Finder-HMM, and Puzzle AI** | *C++, Java* January, 2022 | GitHub
- **Information-System-Design** | *Draw.io, PowerPoint* January, 2022 | GitHub
- **Full Working Compiler** | *Flex, Bison, EMU 8086* September, 2021 | GitHub
- **4-bit MIPS Pipeline** | *Proteus 832, Logisim* September, 2021 | GitHub
- **File Transfer TCP** | *Java, Socket Programming* January, 2021 | GitHub
- **Data Structure and Algorithm Projects** | *C, C++* January, 2021 | GitHub
- **Numerical Methods Solving Tool** | *Python, Numpy, Pandas* April, 2019 | GitHub
- **Word Count JavaFX** | *Java, JavaFX* January, 2019 | GitHub
- **Text Sliding iGraphics** | *C++, iGraphics Custom Library* November, 2018 | GitHub
- **Analog Clock iGraphics** | *C++, iGraphics Custom Library* November, 2018 | GitHub

HIGHLIGHTED ACADEMIC COURSES

- **CSE-409** Computer Graphics
- **CSE-405** Computer Security
- **CSE-423** Fault-Tolerant Systems
- **CSE-471** Machine Learning
- **CSE-215** High-performance Performance Database Systems

ACHIEVEMENTS

Achievements in Capture the Flag (CTF) Competitions

* Placed Top 10 in the National Cyber Drill 2023
* Placed Final Round in the Leetcon CTF
* Placed Final Round in the SUST CTF

Mathematical Olympiad -Position: 3^{rd} - Regional

Victory and Independence Day Art And Literature Competition Award - Position: Top 1

SCHOLARSHIPS

Dean's List Scholarship, BUET, 2022-23
Students obtaining an average GPA of 3.75 or above in two consecutive terms.

Technical Scholarship From Government, BUET, 2017-22
Complimentary scholarship for regular engineering students in BUET.

Government Scholarship, BANGLADESH, 2015-17
Awarded For Outstanding Performance in Secondary School Certificate Examination.

Extra-curricular Activities

Cyber-Security Club - Vice President

* Planning and organizing workshops and Capture the Flag (CTF) competitions .
* Led a team of members to participate in Cyber-security events, providing mentorship and guidance
* Collaborated with professors and industry professionals to provide resources and opportunities.

Attended green brick project organize by UNDP Bangladesh

ESPL Mobile Legend tournament runners-up (2020-21)

TECHNICAL SKILLS

Languages: Java, C, C++, Python, Matlab, JavaFX, Gnu-Plot, Bash, Assembly, Swing

Database: Oracle, MySQL, SQLite, MongoDB

OS: Windows, Linux (Kali, Ubuntu, Seed-Lab)

Version Control: Git (GitHub)

Frameworks: JavaFX, Django, Node.js, React

Web Technology: HTML, CSS, PHP, Bootstrap, WordPress, JSON, XML

Graphics Technology: AutoCAD, Photoshop, Illustrator, PowerPoint, Premier Pro, Kine-Master

Compiler Tools: Flex, Bison, EMO 8086

Micro-Controller: Arduino, ATMega 32, Atmel Studio, Proteus 832

Technical Writing: LaTeX, Beamer, Overleaf

Other: Networking Simulator 3 (NS3), iGraphics, Cisco-Packet-Tracer, PyTorch, OpenGL

CERTIFICATES

Project Show Judge, Faculty Induction Training UIU - Fall 2023 and Spring 2023 Sessions

Problem Solving - Codeforces, Hackerrank, Choco-solver (CSP), Informatics Olympiad

Animation, Digital Marketing, Photography & Graphics Design - 10 Min School, G-Learn

REFERENCES

Dr. M. Sohel Rahman
Professor, Department of Computer Science and Engineering
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh.
Email: sohel.kcl@gmail.com
Phone: +8801552389480
Relation: Thesis Supervisor

Dr. Joanna C. S. Santos
Assistant Professor, Department of Computer Science and Engineering
University of Notre Dame, 382 Fitzpatrick Hall, Notre Dame, IN 46556
Email: joannacss@nd.edu
Relation: Research Advisor

Dr. Tanzima Hashem
Professor, Department of Computer Science and Engineering
Bangladesh University of Engineering and Technology, Dhaka, Bangladesh.
Email: tanzimahashem@gmail.com
Relation: Research Supervisor