Sheikh Hasanul Banna

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Education

Bangladesh University of Engineering and Technology 2019 - 2024
BSc in Computer Science and Engineering *Dhaka, Bangladesh*

- **CGPA: 3.79/4.00**
- **Completed Courses:** Artificial Intelligence, Machine Learning, Data Structures and Algorithms, Database, Software Engineering, Information System Design, Operating System, Computer Architecture, Computer Networking, Computer Security, Operating System, Compiler, Computer Graphics, Basic Graph Theory, Algorithm Engineering, Bioinformatics, Discrete Mathematics, Concrete Mathematics, Numerical Methods.

Research Interests

- Computer Security
- Computer Networking
- Digital Forensics
- Human-Computer Interaction
- Human-Centered Computing
- Machine Learning

Research Experience

- **People's Perception on the Security and Usability of Blockchain Technology in Digital Financial Services in Bangladesh**
- **Field: Human-Computer Interaction**
- Under supervision of **Dr. Rezwana Reaz** (2023 - 2024)
- **My Contribution**: Conducted a survey on two groups for observing how they perceive the use of blockchain technology in Digital Financial services in terms security and usability. Then used Mann-Whitney U test to perform quantitative analysis to find out if they perceived any difference. Then concluded that the use of blockchain had a positive impact on perceived security but no significant difference was found for perceived usability.
- Collaborated with **Dr. Sadia Sharmin** and submitted to **HCI International** conference.

- **Open Source Threat Intelligence Using LLMs and Social Media Posts**
- **Field: Cyber Security**
- Under supervision of **Dr. Md. Shohrab Hossain**
- Submitted to IEEE MILCOM (Under Review)
- **My Contribution**: Created a synthesized dataset from scrapped reddit posts. Then Applied LLM models to provide verdict regarding if the posts contained potential vulnerabilities.

Work Experience

- **Presidency University** **Oct 2024 - Present**
- Lecturer, Department of Computer Science and Engineering.
- **Courses Taught**: Computer Networks and Security, Digital Logic Design, Database Systems, Data Structure and Algorithms
- Have been awarded best teacher multiple times for excellent teaching and passion.

Technical Skills

Languages: C, C++, Java, Python, Assembly, javascript, Go
Tools and Frameworks: Putty, React, Nextjs, MaterialUI, Git, Oracle DBMS, MySQL, Expressjs, PostgreSQL
Operating Systems: Windows, Linux
Libraries: Sklearn, Pandas, Seaborn, Pytorch, Tensorflow

English Proficiency

TOEFL ibt: 111
Reading: 30 | **Listening**: 29 | **Speaking**: 26 | **Writing**: 26

Projects

Integration of Attendance Record System into a University's central server | *Bash, Putty, MySQL, PHP*
- Created automatic communication channel between fingerprint server and University's EMS server.
- Developed a bash script that migrates microsoft access db to MySQL db (complete automation with security credentials).
- Used Putty to write and upload codes into the EMS server.

Implement and Modify WestwoodBR Congestion Control Algorithm | *C++, NS2, Bash*
- Implemented Westwood BR congestion control algorithm according to the research paper.
- Made small modifications to the algorithm by adding an extra level that further controls the window size according to the traffic level.
- Afterwards, monitored the throughput, drop rate and window size change in various wireless networks.
- The modified algorithm performed better than base Westwood and Newreno in almost all cases. The change in window size was more varied than Westwood but more conservative than Newreno.

MKLOGA Keyboard Layout Optimization Extended for Bangla Keyboard | *Perl, Python, Pytorch*
- A bangla keyboard layout optimization using carpalx fitness function, genetic algorithm and deep learning.
- Initially, the default layout for Bijoy is given. The model is trained to be able to calculate fitness function.
- A corpus of bangla wikipedia article was given to train and then the genetic algorithm on a deep network was run to find fitness values for each newly generated layout.
- When better layouts were not found for a few iterations, the process would stop and we would get our desired keyboard layout.

Discover Hidden Contents in Websites using Gobuster | *Gobuster, Go*
- Used the Gobuster tool to find hidden directories under forbidden paths in multiple websites
- Extracted hidden files from Google Cloud and Amazon S3 buckets.
- Extracted API keys and server configurations from hidden json files.

Travelling Salesman Problem: Implementation and Modification | *Python*
- Took a large dataset of graphs and implemented the basic Christofide's algorithm of TSP.
- Then imlemented simulated annealing and measured the completion time on different tsp datasets.
- Also implemented a randomized Christofide's algorithm, that performed better than other algorithms for some graphs.

Medist | *React, Express.js, Tailwind, PostgreSQL, puppeteer*
- A System where people can search for information regarding medicines and get appointments with doctors via google meet.
- Uses Web Scrapping tool (puppeteer) to crawl website and get medicine info.
- Implemented Microservice architecture and Used RabitMQ for communication among the services.
- Used Postgresql for database.
- Used Typescript with ExpressJS, React
- Implemented prescription PDF generation.

Building Compiler From Scratch | *YACC, Bison, C++, Flex*
- Built all 4 main functionalities of a compiler from scratch.
- Symbol table generation using C++.
- Lexical analyzer using Flex
- Syntax and Semantics analyzer using Flex and Bison.
- Finally used Bison (Yacc) to build intermediate code that can run on Emu 8086.

Canteen Food Ordering System using Microcontroller | *Python, Arduino C++, MySQL*
- Using Arduino Mega, RFID reader, and messaging system built a small token-based food ordering system.
- Used Python and Aduino C++ for communication between hardware and database to verify token and then send message.

4 Bit MIPS Design Using Atmega32 and Basic ICs | *Python, Assembly 8086*
- Using Python, generated instruction bits from assembly - 8086.
- Using atmega32, sent instruction bits to the ICs to complete the instructions and save results in memory.

Achievements

- Dean's List Award: Awarded for excellent academic results.
- National Science Olympiad (College): District Champion (Noakhali, Bangladesh)
- Bangladesh Physics Olympiad (College): Reached National Stage (2017)

Extracurricular Activities

- Worked as an examiner at Bangladesh Physics olympiad.
- Took part in organizing and planning of BUET CSE FEST 2024.
- Tutored multiple high school and college students.
- Worked as an active member of Badhon BUET Zone - A blood donation organization.

References

1. Dr. Rezwana Reaz
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2. Dr. Md. Shohrab Hossain
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