# MOHAMMAD SHAMIM AHSAN

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## ABOUT ME

Want to explore and learn new things. Passionate about working on Computer Networks & Security. Always enjoy working with hard-working & enthusiastic people and have a strong commitment to research.

## EDUCATION

**Bangladesh University of Engineering & Technology** April, 2018 - May, 2023
Bachelor of Computer Science and Engineering
Department of Computer Science and Engineering **CGPA**: 3.64/4.00

**St. Joseph Higher Secondary School, Dhaka** July, 2015 – July, 2017
Higher Secondary Certificate (HSC)
Division of Science **GPA**: 5.00/5.00 (90.3%)

**Bangladesh Navy School and College, Chittagong** January, 2013 - April, 2015
Secondary School Certificate (SSC)
Division of Science **GPA**: 5.00/5.00

## RESEARCH EXPERIENCE

**Bangladesh University of Engineering & Technology** May, 2022 - March 2023
**Title:** Detecting User Activity from Encrypted IoT Traffic
*Undergraduate Research Assistant*
**Supervisor:** Dr. Md. Shohrab Hossain **(BUET)** **Collaborator:** Dr. Anupam Das **(NC State University, USA**)

- Implemented a methodology called "*packet-based signature generation & detection system*" for automatically extracting packet-level **signatures** from their network traffic and detecting events of smart home devices.
- Used **Java** at a large scale as the project **codebase** was in Java**.**
- Needed to write **Python**, **Shell-script** and **C++** programmes.
- Monitored network traffic using **Wireshark**.
- Used 4 datasets: **PINGPONG**, **UNSW**, **YourThings**, **Mon(IoT)r**.
- Outperformed the average recall and precision of the existing system.
- Worked as ***first author***; contributed *significantly* in writings.

**Bangladesh University of Engineering & Technology** January, 2023 - April 2023
**Title:** Randomization in Double Coverage Algorithm on a Line for Online *k*-Server problem
*Undergraduate Research Assistant*
**Supervisor:** Dr. Md. Saidur Rahman **(BUET)** **Collaborator:** Dr. Abu Reyan Ahmed **(Colgate University, USA)**

- Studied **exact** algorithms, **approximate** algorithms, **randomized** algorithms, **online** algorithms, **heuristics** and **metaheuristics**, and **low memory** algorithms.
- Worked on the implementation of randomization techniques to find ***k*-competitiveness** on the well-known **Double Coverage Line** algorithm.
- Used the **Potential Function Method** and **Interleaving Move Style** for competitive analysis of the algorithms.
- Studied some algorithms in different metric spaces.
- Worked as ***first author***; the core idea, analysis & proof was mine.

*********This paper is **submitted** in the International Symposium on Mathematical Foundations of Computer Science (**MFCS**) 2023*

## ACADEMIC PROJECTS

***Image Caption Generator using CNN and LSTM*** February, 2023
**Python**, **Flickr dataset** Github
Implemented an image caption generation architecture with **a team of 2 people** where I rolled as a **leader**. In this project,

- Recognized the context of an image and annotated it with relevant captions using **deep learning** and **computer vision**.
- **CNN** was used to generate a vectorized representation of an image. Then, **LSTM** used the information from CNN to help generate a caption of the image.
- Implemented **Greedy** and **Beam search** strategies and evaluated our architecture using **BLEU** and **METEOR** metrics.

***Spacey: Online Space Rental Platform*** August, 2022
**MongoDB**, **Express.js**, **Rest.js**, **Node.js**, **CSS** Github, Github
Created an online platform with **a team of 3 people** where property owners can rent their places or free spaces which helps travelers or business companies to find a home/storage to use. Also designed **BPMN**, **Mock UI** (using **Figma**), **Class**, **ER**, **Sequence**, and **Collaboration diagrams**. Since this kind of platform has not been established significantly in the under-developing countries, like Bangladesh, we aimed for making this easier and popular to people.

***TCP CERL: congestion control enhancement over wireless networks*** February, 2022
**Network Simulator 3(NS3)**, **C**, **Python**
In this project,
- Studied the **TCP-CERL** technique for enhancement of congestion control which is the sender-side modi- fication of **TCP-Reno**.
- Implemented this technique in NS3. The implementation that the authors of the paper did was in NS2.
- Tested on two wireless networks: **Wi-Fi** and **LR-WPAN**. Then, calculated various **performance metrics** such as throughput, end-to-end delay time, delivery-ratio and loss-ratio.

***Super Mario (Microcontroller project)*** July, 2021
**C**, **Atmel Studio**, **Proteus 8**
This is a Proteus **simulation-based** Microcontroller project. Developed a game similar to the super mario using **ATmega32**, **LED green Dot Matrix** and **LCD display**.

***MediSheba*** October, 2020
**Django**, **HTML**, **CSS**, **Oracle SQL** Github
Developed an online medical system with **a team of 3 people** where doctor, patient and blood-bank are the main modules. Django is used here as a framework in Back-end and HTML, CSS are used here as Front-end. The (oracle-based) database of the project was **designed extensively following the relevant ER diagrams**.

## MAJOR ASSIGNMENTS

- ***SEED-LABS Attacks*** July, 2022
  Implemented some SEED-LABS attacks such as **Buffer overflow**, **CSRF**, **XSS**, **SQL injection** and **Morris worm**.
- ***Bangla Handwritten Character Recognition using CNN*** February, 2023
  Designed own CNN model from scratch using python and tested on the **NumtaDB** dataset.

## PRESENTATIONS

- **Conference** presentation in IEEE Computer Society Bangladesh Chapter Summer Symposium 2023 **(IEEE CS BDC SS)**, **Topic:** Randomization in Double Coverage Algorithm on a Line for Online $k$-Server problem.

## SKILLS

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|---|---|
| **Languages** | C, C++, Java, Python, Shell script, JavaScript, SQL |
| **Frameworks** | Django, React.js, Express, Node.js |
| **Databases** | Oracle, MongoDB |
| **Web Technologies** | HTML, CSS, Bootstrap |
| **Operating Systems** | Windows, Ubuntu, WSL |
| **Technical Writing** | LaTeX, Beamer, Overleaf |
| **Others** | Git (GitHub), NS3, XV6, Docker, OpenGL, MS Word, MS Excel, MS PowerPoint |

## ACHIEVEMENTS

**Dean's List Award, Bangladesh University of Engineering & Technology** 2022- 2023
For outstanding academic performance in **4th** year (with average GPA: 3.97/4.00)

**Government Scholarship, Bangladesh** 2017- 2022
For outstanding performance in Higher Secondary Certificate Examination
**Region position**: 83

**Government Scholarship, Bangladesh** 2015- 2017
For outstanding performance in Secondary School Certificate Examination
**Region position**: 135

**College Final Examination** 2016
**Merit position**: 1 (in whole college)

## HIGHLIGHTED ACADEMIC COURSES

**Undergraduate courses,** Bangladesh University of Engineering and Technology

- CSE-321 Computer Networks
- CSE-405 Computer Security
- CSE-471 Machine Learning
- CSE-461 Algorithm Engineering
- CSE-423 Fault Tolerant Systems
- CSE-453 High Performance Database Systems

## LANGUAGES

| **English** | **Bangla** | **Hindi** |
|---|---|---|
| Professional Working Proficiency | Native | Listening & Speaking |