

# MEHEDI HASAN

☎ (+880)196-950-0278 ✉ mhasan912@gmail.com 🔗 linkedin.com/in/moidda 🌐 https://github.com/Moidda 🌐 https://moidda.github.io  
🎓 Scholar 🆔 ORCID

## RESEARCH INTEREST

I am a **Software Engineer** specializing in Algorithms & Research at Chaldal. Outside of work, I am involved in academic research. My primary area of interest is **Human Computer Interaction**, including **Accessibility**, **Security & Privacy**, **Health & Eudaimonia**. I'm also passionate about **Visualization**, **VR/AR**, and **Ubiquitous** technologies. Through my work experience, I've gained expertise and interest in **Algorithms** and **Systems**, including **Networking**, **Distributed Systems** and **System Design**.

## EDUCATION

### BSc in Computer Science and Engineering

May 2023

Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

CGPA: 3.57/4.00 Last Two Terms: 3.82/4.00

Notable Courses:

CSE 305 - Computer Architecture

CSE 321 - Computer Networks

CSE 471 - Machine Learning

CSE 461 - Algorithm Engineering

CSE 313 - Operating System

CSE 405 - Computer Security

CSE 309 - Compiler

CSE 463 - Introduction to Bioinformatics

CSE 409 - Computer Graphics

MATH 247 - Linear Algebra

MATH 145 - Calculus and Coordinate Geometry

HUM 477 - Sociology for Science and Technology

## ENGLISH PROFICIENCY

### TOEFL iBT

December, 2023

Reading: 25/30, Listening: 28/30, Speaking: 30/30, Writing: 29/30 Total: 112/120

## PUBLICATIONS

- Mubassira, T., Hasan, M., Sharmin, S. (2024). "Reading the Mind's Eye: Detecting Trauma-Vulnerability in Individuals by Analyzing Attention Through Eye-Tracking". In: Zaslavsky, A., Ning, Z., Kalogeraki, V., Georgakopoulos, D., Chrysanthos, P.K. (eds) Mobile and Ubiquitous Systems: Computing, Networking and Services. MobiQuitous 2023 (EAI MobiQuitous 2023). DOI: 10.1007/978-3-031-63992-0\_28
- Mubassira, T., Hasan, M., Noor, J., Islam, A (2024). "Enhancing EmoBot: An In-Depth Analysis of User Expectation and Satisfaction in An Emotion-Aware Chatbot". In: International Conference on Networking, Systems and Security, 2024. DOI: 10.1145/3704522.3704527

## RESEARCH EXPERIENCE

### Detecting Sentiment in Anonymous Submissions: A Study on User Report Data

Human Computer Analysis, Sentiment Analysis

Sep 2024 - Current

- **Supervisor:** Dr. A. B. M. Alim Al Islam, Professor, CSE, BUET
- **Contribution:** Performed sentiment analysis on crowd sourced anonymous reports

### Towards perceiving and resolving the impediments to reporting for the developing countries

Human Computer Interaction, Generic Reporting System

Aug 2024 - Current

- **DOI:** 10.1109/NSYSS2.2017.8267790
- **Live At:** ureporter.cse.buet.ac.bd
- **Supervisor:** Dr. A. B. M. Alim Al Islam, Professor, CSE, BUET
- **Collaboration:** With Tarik Reza Toha, University of North Carolina at Chapel Hill
- **Contribution:** Improved the system in collaboration with the research team

### Fine-Tuning GPT-2 for Bengali Auto Text Completion Using Literary Corpus: A Qualitative Analysis

Natural Language Processing, Machine Learning

Jan 2023 - Mar 2023

- **Presentation:** Slides
- **Supervisor:** Dr. Mohammed Eunus Ali, Professor, CSE, BUET
- **Contribution:** Fine-tuned GPT-2 with a Bengali literature corpus to improve auto text completion

## INDUSTRY EXPERIENCE

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### Chaldal Ltd.

June 2023 – Present

#### R&D

##### ASAP Delivery

- Designed an algorithm to **calculate geographical area overlapping a route**, through which a driver can detour for a specific slack time period to deliver to a new location without impacting other deliveries in the route
- **Impact:** Grocery delivery within 20 to 40 minutes in Dhaka

##### Last Mile Routing Algorithm

- Designed a new **routing algorithm** using different heuristic and probabilistic search methods
- **Impact:** Increased on-time delivery by 15%

##### Traffic Estimate

- Developed a **timeseries database** and supervised an interpolation project using **spatio-temporal models** to fill missing traffic speed data.
- **Impact:** Improved estimates for Dhaka roads by 53.53% for cycles, 28.83% for motorbikes, and 28.73% for vans

##### Automate Task Assignment

- Designed and deployed an algorithm for solving the **task assignment problem** via an API endpoint, integrated into a system for periodic task assignment within the warehouse.
- **Impact:** Increased on-time dispatch by 16%

#### System Design

##### Micro-services communication

- Designed and implemented a **gRPC-based communication system** across three services to transmit information at specific events, tested it in a QA environment, and oversaw its system-wide deployment.
- **Impact:** Decreased driver idle time by 7 minutes

##### Spatial Database Model

- Developed a **spatial database model** which can store polygonal area and query with intersecting geolocation
- **Impact:** Enhanced vehicle utilization by restricting certain vehicle types in specific areas

##### Re-Modeling Task Assignment system

- Designed a more efficient task assignment model, refactored existing models, redesigned the UI, and improved underlying logic.
- **Impact:** Increased picker's efficiency by 1.2x

## CONFERENCES AND TALKS

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### State of the Map Asia 2024

30 Nov-1 Dec, 2024

Cox's Bazar, Bangladesh

Invited to present a talk on the opportunities of OpenStreetMap and how to contribute to the community

### How BUET Alumni Help Build Infrastructure of Bangladesh through Software

05 March, 2024

BUET, Dhaka, Bangladesh

Discussed my work, its impact on Bangladesh's infrastructure, and how it differs from a traditional software engineering role.

### NSysS 2023 - 10th International Conference on Networking, Systems and Security

21-23 December, 2023

BUET, Dhaka, Bangladesh

Presented our paper accepted in the conference alongside my co-author

### EAI MobiQuitous 2023 - 20th EAI International Conference on Mobile and Ubiquitous Systems: Computing, Networking and Services

14-17 November, 2023

RMIT University, Melbourne, Australia

Presented our research work at the time alongside my co-author

## EXTRACURRICULAR ACTIVITIES AND LEADERSHIP

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### BUET CSE Fest AI Contest

15-23 July, 2022

Lead Organizer

Actively managed, set problem and judged the submissions of AI contest that had over 100 participants, hosted in codingame.com

## ACHIEVEMENTS AND AWARDS

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2022 5<sup>th</sup>/50 Code Samurai Hackathon  
2021 Hackerrank: Problem Solving (Intermediate)  
2020 Codeforces Max Rating: Expert (1871)  
2019 8<sup>th</sup>/86 BUET CSE FEST IUPC  
2019 10<sup>th</sup>/84 DUET IUPC  
2019 13<sup>th</sup>/59 NSU Cybnauts National Programming Contest  
2019 13<sup>th</sup>/96 RUET IUPC  
2019 14<sup>th</sup>/84 IUT IUPC  
2019 18<sup>th</sup>/109 SUB IUPC  
2019 34<sup>th</sup>/119 SUST IUPC  
2016 2<sup>nd</sup>/100 Laboratorians Festival Math Olympiad  
2015 8<sup>th</sup>/1000 Regional Math Olympiad  
2014 2<sup>nd</sup>/500 National Astronomy & Astrophysics Olympiad

## SELECTED PROJECTS

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### Trapped (Game)

Unity Game Engine, C#

Developed a 2D action and puzzle platformer

### Codingame: Steal The Flag

Java

Developed and hosted a game on codingame.com

### P5js-Raycasting

Javascript, HTML

Implemented raycasting using p5-js library for visualization

### xv6 Memory Management (OS)

Linux, C, bash, kernel programming

Enhanced the xv6 operating system by adding support for memory management.

### Simple C Compiler

C, YACC, Bison

Developed a C compiler capable of reading small C programs and generating corresponding machine code for execution.

### CNN from Scratch

Python

A simple implementation of a convolutional neural network using Python and NumPy, trained on the NumtaDB dataset to recognize Bengali digits.

### Chaldaal (Web App)

django/python, oracle/sql, HTML/CSS, JS

Created an online grocery shop similar to chaldal.com

### Smart Construction Work System (Web App)

Django, SQLite, HTML/CSS, JS

Developed a citywide smart construction management system

## REFERENCES

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### Dr. Sadia Sharmin

Associate Professor

Department of Computer Science and Engineering  
Bangladesh University of Engineering and Technology

Email: sadiasharmin@cse.buet.ac.bd,  
sadia@teacher.cse.buet.ac.bd

Contact: +880 1817 108555

### Dr. A. B. M. Alim Al Islam

Professor

Department of Computer Science and Engineering  
Bangladesh University of Engineering and Technology

Email: alim\_razi@cse.buet.ac.bd

Contact: +880 1817 533953

### Dr. Mohammed Eunus Ali

Professor

Department of Computer Science and Engineering  
Bangladesh University of Engineering and Technology

Email: eunus@cse.buet.ac.bd

Contact: +880 2 9665612

### Dr. Jannatun Noor

Assistant Professor

Department of Computer Science and Engineering  
Brac University

Email: Jannatun.noor@bracu.ac.bd

Contact: +880 1911 058877