Sk Sabit Bin Mosaddek

Lecturer, BracU (CSE)
BSc. Graduate of 2024, Dept. of CSE, BUET
46th ICPC World Finalist - Asia West Champion , **ICPC ID**
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Research Interest

Computer Vision, Deep Learning, Machine Learning, Artificial Intelligence, Algorithms

Education

Bangladesh University of Engineering and Technology (BUET) CGPA : 3.83/4.00
B.Sc.Engg. in Computer Science and Engineering; 29 April 2019 – 1 July 2024 *Major CGPA : 3.91/4.00*

- Lab coursework repository : **github.com/SA011/BUET-Academic-Coursework**
- **Dean's list award and university merit scholarship recipient in Level 1, 3 and 4**
- **RISE-BUET Internal Student Research Grant for undergrad thesis**, Details
- **Research Poster Presentation in 10th NSysS 2023**, Poster
- **Notable Courses :**
  Machine Learning, Artificial Intelligence, Bioinformatics, Software Engineering, Information System Design, Computer Security, Operating Systems, Computer Networks, Data Structures and Algorithms, Database Systems, Computer Graphics, Numerical Methods, Discrete Mathematics, Object Oriented Programming

Birshreshta Noor Mohammad Public College GPA : 5.00/5.00
Higher Secondary Certificate (Science) *Jul 2016 - Jul 2018*

- **Board talentpool scholarship recipient in Dhaka Board.**

Work Experience

Full-time Lecturer, Brac University July 2024 – Present
Department of Computer Science and Engineering *Dhaka, Bangladesh*
Courses Taught : Programming Language-II, Data Structure, Algorithm

Junior Backend Developer Intern (Part-time), Tallykhata January 2024 – May 2024
contributed to developing experimental projects of company *Dhaka, Bangladesh*

Competitive Programming Trainer, Bangladesh University of Professionals July 2023 – December 2023
Trained students at BUP to help develop a better algorithmic problem solving skill *Dhaka, Bangladesh*

Machine Learning Intern (Part-time), RedDot Digital Limited May 2023 – June 2023
Contributed to developing an Android App for Client-side verification of National ID Card images *Remote*

Technical Skills

Languages	:	C/C++, Python, Java, Javascript, x86 Assembly, Bison/Flex, Bash, MySQL, LaTeX
Frameworks	:	React.js, Node.js, SpringBoot, Oracle, PostgreSQL, Docker, NS2, xv6, Git, Wireshark
Libraries	:	NumPy, Keras, Matplotlib, OpenCV, OpenGL, Pandas, Scikit Learn
Soft Skills	:	Problem Solving (Solved 3000+ problems), Teamwork

Notable Programming Contest Achievements

Asia West Champion (Overall 26th) in International Collegiate Programming Contest World Final 2022

2nd Runner-up in International Collegiate Programming Contest Asia West Continent Final Contest, 2021

Grandmaster in Codeforces, max rating : 2403 , Top 1% worldwide, Top 0.01% in country

221th in Meta Hackercup Round 3, 2021, **286th** in Google Code Jam Round 3, 2021

ICPC Asia Dhaka Regional contest, 2022 : **Champion**, 2021 : **1st Runner-up**

Champion, Inter University Programming Contest, RUET 2022

1st Runner-up, Inter University Programming Contest: AUST 2022, SUST 2023

Research Experience

Advancing Agricultural Field Segmentation Using Deep Learning Jun 2024 - Present

Research Project, Computer Vision

- Identifying crop types using agricultural field segmentation and determining the harvesting stages of crops. Additionally, NDVI range is calculated for those fields. The dataset, our team has created consists of Drone, Planet, Setinel and Landsat images.
- **Tools and Technology:** Python (Pytorch, Rasterio, OpenCV), Segment Anything Model
- **Supervisor :** Dr. M. Sohel Rahman, Professor, CSE, BUET, Dr. Sara Nowreen, Professor, IWFM, BUET

Advancing Code Review and Code Refinement Automation Using LLMs July 2023 - Present

Undergraduate Thesis (Ongoing), NLP Group, CSE-BUET | Abstract | Manuscript under Preparation

- Designing prompts augmenting static program metadata (function call graph) and natural language summary, and qlora fine-tuning to improve code review comment and code refinement generation tasks
- **Tools and Technology:** Python (Pytorch), TreeSitter, OpenAI GPT API, CodeT5, CodeLlama, Llama 3
- **Supervisor :** Dr. Anindya Iqbal, Professor, CSE, BUET, Dr. Toufique Ahmed, PhD, UC Davis

Faster and Improved CD-MAWS with Suffix Automata Jan 2024 - Apr 2024

Research Project, Suffix Automata, BioInformatics | Paper Under Review | submitted to WALCOM 2025

- Introduced a refined *CD-MAWS* method for phylogeny estimation, significantly reducing computational complexity from $\max(O(m^n), O(m^n \log n))$ to $\max(O(m^n), O(mnk))$ while maintaining tree quality, through a revised cosine distance calculation method, binary encoding of MAWs, and the adoption of suffix automata for MAW generation.
- **Supervisor** : Dr. M. Saifur Rahman, Professor, CSE, BUET

Academic Projects

Face aging and de-aging using generative adversarial networks | 2024 *Python* Source Code

- A **computer vision project** for face aging and de-aging using generative adversarial networks (GANs) with a focus on preserving identity and facial attributes, under the supervision of Ajmain Yasar Ahmed, Lecturer, CSE, BUET.

ML Algorithm, FNN, PCA and EM | 2024 *Python* Source Code

- Implemented FNN from Scratch, Adaboost algorithm with Logistic Regression
- Implemented PCA & clustering with EM algorithm on gaussian mixture models from scratch.

Chess Engine | 2023 *Python* Source Code

- A chess engine built from scratch which can beat a few levels of stockfish. It uses Minimax algorithm with Alpha-Beta pruning.

Ray Tracing & Raster Based Pipelines | 2023 *C++, OpenGL* Source Code

- A project regarding computer graphics. Z-buffer Algorithm, Ray Casting and Ray Tracing are implemented to render 3D objects.

Hardware Project : Retro Snake | 2022 *AtMega32, C++* Source Code | Youtube Demo

- A Hardware project which uses a micro-controller. LED is used to visualize the program
- Tools : 8x8 bi-color LED, AtMega32, 16x2 I2C LCD, Buzzer , Power Bank - 5V 2A

Dream Sports League | 2023 *Javascript, Node, React, Postgresql* Backend | Frontend

- Online game based on English Premier League. This project was for our Software Development Sessional Course.

C Compiler | 2022 *Lex, Yacc, Assembly, C* Source Code

- Built a simple compiler from scratch in compiler sessional using yacc, c, assembly etc.

SHRED, Packet Tracer and Network Simulator | 2022 *Java, NS2* Source Code

- Implemented server-client socket programming, designed LANs, and simulated wireless networks
- Modified SHRED - An Active Queue Management in NS2 and documented improvement in a report.

Make my Trip : An Online Trip Management | 2022 *Java, Spring Boot, Oracle* Source Code | Youtube Demo

- It is an online ticket booking and trip planning website. It was developed as our database project.

Voluntary Work

BUET IUPC Organizer July 2023

Problemsetter, Judge and Organizer of BUET Inter University Programming Contest 2023

BDOI Judge May 2023

Problemsetter and Judge of Bangladesh National Olympiad of Informatics 2023