

HAFIJUL HOQUE CHOWDHURY

Email: hafijulhoquechowdhury2000@gmail.com | Location: Dhaka, Bangladesh

[Portfolio](#) | [LinkedIn](#) | [Google Scholar](#) | [GitHub](#)

Research Interests: AI Security and Privacy, Systems Security.

Education

Bangladesh University of Engineering and Technology (BUET) Feb 2020 - Feb 2025

B.Sc. in Computer Science and Engineering

CGPA: 3.84 / 4.00

Notable Coursework: Computer Security, Machine Learning, Software Engineering, Computer Networks, Artificial Intelligence, Fault-Tolerant Systems

Notre Dame College, Dhaka Jun 2017 - Jun 2019

Higher Secondary Certificate (HSC)

GPA: 5.00 / 5.00

Work Experience

Lecturer

[United International University](#)

Aug 2025 - Present

- Taught undergraduate theory and laboratory courses including **Machine Learning**, **Data Mining**, **Data Structures & Algorithms I**, **Digital Logic Design Lab**, **Discrete Mathematics**, and **System Analysis and Design**.
- Supervised/co-supervised undergraduate **Final Year Design Projects (FYDPs)** and **term papers**.

Software Engineer-I

[Samsung R&D Institute Bangladesh](#)

Apr 2025 - Aug 2025

- Contributed to the [Samsung Health Research Platform \(HRP\)](#) across Android and backend development.
- Implemented **real-time wearable status syncing** and resolved critical wearable/mobile issues using **Kotlin**, **Jetpack Compose**, and **gRPC**.
- Developed backend platform features using **Spring Boot (Kotlin)** and **MongoDB**, including integration with **Amazon S3**.

Research Experience

1 Identifying and Addressing User-level Security Concerns in Smart Homes Using “Smaller” LLMs 2025

Supervisor: [Dr. Md. Shohrab Hossain](#) (CSE, BUET) | Collaborator: [Dr. Suryadipta Majumdar](#) (Concordia University)

| [Privacy, Security & Trust \(PST 2025\)](#) | [Accepted](#) (acceptance rate ~26%) | [IEEE Xplore](#) | [arXiv](#)

- Constructed a domain-specific dataset from real-world discussions in public forums to capture practical security concerns faced by smart-home IoT users.
- Fine-tuned **T5** and **Flan-T5** transformer models to develop a lightweight question-answering system specialized for smart-home security queries.
- Assessed the proposed framework using evaluation metrics including **F1 Score**, obtaining an **89.77% improvement in validation performance** for domain-specific question answering.
- Applied **LDA-based topic modeling** to identify and organize prevalent security concerns, while using synthetic data generation to improve the diversity and coverage of the dataset.

Supervisor: [Dr. M. Saifur Rahman](#) (CSE, BUET)

[Submitted to NSysS 2026](#) | [IEEE Signal Processing Cup 2025 - 1st Runner Up](#) | [arXiv](#)

- Curated training data from eight **DeepFakeBench** datasets and augmented them with synthetic samples generated using diffusion models, GANs, and VAEs to improve model robustness across diverse manipulation techniques.
- Fine-tuned **MaxViT**, **CoAtNet**, and **EVA-02** backbones using supervised contrastive loss and focal loss to learn more discriminative feature representations and improve classification performance.
- Developed a multi-stage detection pipeline combining backbone training, classifier fine-tuning, and a majority-voting ensemble, achieving **95.83% validation accuracy** while mitigating class imbalance.

Academic Contributions & Supervision Experience

- **Final Year Design Project Supervisor, United International University:** “Who Does the Model Think You Are? A Study of Skin-Tone Stereotyping in VLM-Generated CVs”
 - Supervised the design of a controlled synthetic face-image dataset with systematic skin-tone variation for studying bias in AI-generated and AI-evaluated resumes.
 - Designed the experimental methodology and guided the **quantitative and qualitative bias analysis**, while contributing to manuscript preparation.
- **Final Year Design Project Supervisor, United International University:** “Learner-State-Aware Adaptive AI Learning Companion”
 - Supervising the design of an **AI learning companion for DSA** that guides learners through a pedagogical framework rather than directly providing answers.
 - Contributing to the learner-state modeling, tutoring-strategy design, and overall LLM-based learning pipeline.

Projects

Xv6 Memory Management

[GitHub](#)

C, xv6, Operating Systems

Extended xv6 with demand paging and FIFO page replacement. Implemented page-fault handling, swap-space management, page eviction, and virtual-memory bookkeeping so processes could execute with a working set larger than available physical memory.

Xv6 Threading Implementation

[GitHub](#)

C, xv6, Operating Systems

Extended the xv6 kernel with threading support for concurrent execution within a process. Implemented shared-address-space thread creation, scheduling-related support, user-level thread primitives, and synchronization mechanisms.

Subset of C Compiler

[GitHub](#)

C, Flex, Bison/YACC, 8086 Assembly

Built an end-to-end compiler pipeline for a subset of C, including lexical analysis, parsing, symbol-table and scope management, semantic analysis, error checking, intermediate processing, and 8086 assembly code generation.

Pneumonia Detection using Multi-Scale Transformer Approach

PyTorch, ResNet, Vision Transformer (ViT), Deep Learning

Developed and evaluated a pediatric chest X-ray classification pipeline combining ResNet-based feature extraction with Vision Transformer backbones and dynamic feature fusion for pneumonia detection.

Awards

[IEEE Signal Processing Cup 2025 - 1st Runner Up](#)

2025

Team Straw Hats placed first runner-up in the DFWild Cup deepfake-detection challenge after competing against more than 100 teams worldwide; the work was presented at [ICASSP 2025](#).

Awarded in **3 out of 4 levels** for academic performance during the B.Sc. program.

Technical Skills

Programming Languages: C, C++, Java, Kotlin, JavaScript, Python, SQL, Bash

Machine Learning & Deep Learning: PyTorch, TensorFlow, Keras, Scikit-learn, Hugging Face Transformers, OpenCV, NumPy, Pandas, Matplotlib, Seaborn

Frameworks & Development: React.js, Next.js, Node.js, Spring Boot, Django, .NET, Android, JavaFX, Tailwind CSS, OpenGL

Database Systems: PostgreSQL, MongoDB, Oracle

Cloud & DevOps: AWS (EC2, S3), Docker, Git

Systems & Networking: xv6, ns-3

References

- **Dr. Md. Shohrab Hossain, Professor**
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- **Dr. Mohammad Saifur Rahman, Professor**
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