

Abdullah Nayem Wasi Emran

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RESEARCH INTERESTS

- Computational Biology
- BioInformatics
- Medical Imaging
- Health Informatics
- Computer Vision
- AI for Healthcare

EDUCATION

- **Bangladesh University of Engineering and Technology** Dhaka, Bangladesh
B.Sc. in Computer Science and Engineering; CGPA: 3.82/4.00 Feb 2020 - Mar 2025
Notable Courses: Linear Algebra, Data Structures and Algorithms, Numerical Methods, Artificial Intelligence, Compiler, Computer Networks, Introduction to Bioinformatics, Database, Software Engineering

RESEARCH EXPERIENCE

- **Undergraduate Thesis**
Working with [Dr. Rezwana Reaz \(BUET\)](#) Nov 2023 - Ongoing
 - **Task Scheduling in Cloud Computing:** Working on multiple forms of hybrid metaheuristic algorithms by integrating the Fireworks Algorithm (FWA) and Whale Optimization Algorithm (WOA), including sequential, parallel, and component-level integration (where specific elements of one algorithm are embedded into the other), demonstrating improved performance and efficiency over each individual algorithm while maintaining a competitive cost value. Manuscript in preparation. [\[code\]](#)
- **A Tale of Cross-Dataset Analysis on Mental Health**
Working with [Dr. A. B. M. Alim Al Islam \(BUET\)](#) July 2024 - Ongoing
 - **Exploring Mental Health Patterns Across Diverse Populations:** Conducting research on mental health outcomes across three diverse datasets – covering medical students, quarantined individuals, and those with psychiatric disorders – to offer comprehensive knowledge through a cross-dataset lens using statistical and network-based analyses. Manuscript under review. [\[code\]](#)
- **HiFuse and CosSIF for Medical Imaging on DDI Dataset**
August 2024 - Ongoing
 - **Exploring Advanced Classification of Skin Lesions:** Developing a combined approach using HiFuse, a hierarchical multi-scale feature fusion network, and CosSIF, a cosine similarity-based filtering technique, to enhance classification metrics for the DDI dataset, with a focus on accurate detection of malignant lesions. Currently experimenting with various filtering thresholds and feature fusion techniques to improve model sensitivity on imbalanced medical datasets.
- **Analysis and Explainability of ML Models for Cyberattack Detection**
Working with [Dr. A. B. M. Alim Al Islam \(BUET\)](#) October 2024 - Ongoing
 - **Enhancing Multi-Class Cyberattack Detection:** This research focuses on improving the detection of cybersecurity threats by performing a comprehensive comparative analysis of machine learning (ML) and deep learning (DL) models across four prominent cybersecurity datasets. By uncovering unique dataset characteristics and using interpretable AI techniques, we provide insights into model decisions and key features, supporting robust, transparent, and generalizable threat detection across diverse network environments.

PROJECTS

- **Lightweight Deep Learning Models for Histopathological Cancer Cell Classification:** Designed and implemented lightweight models using EfficientNet-B0 to classify histopathological cancer cells. Integrated attention mechanisms like SEBlock, MSFF, and CBAM to enhance feature recalibration, multi-scale spatial learning, and attention refinement. Conducted extensive experiments with transfer learning (pretraining on PathMNIST) and data augmentation to achieve 98% accuracy on the CRC-VAL-HE-7K dataset. [\[code\]](#)
- **Computer Graphics:** Developed a raster-based graphics pipeline and implemented ray tracing using C++ and OpenGL. Applied the Phong Lighting model (ambient, specular, diffuse, and recursive reflection) to generate realistic images of geometric shapes like spheres, triangles, and quadric surfaces. [\[code\]](#)

- **RecipeShare:** Developed a web application for sharing and discovering recipes using Next.js (frontend) and Django (backend). Key features include recipe upload and editing, blog posts, recipe requests, meal planning, and search functionality. Additionally, implemented a feature allowing users to generate recipes from photos of ingredients. [\[code\]](#)
- **Compiler:** Developed a compiler from scratch using Bison and Flex in C++, encompassing the creation of a symbol table, building a lexical analyzer, implementing a semantic analyzer, and generating intermediate code. [\[code\]](#)
- **BookExchange:** Developed a platform where users can sell, give away, borrow, or rent books. Key features include book comparison, user reviews, and search functionality. Implemented using Next.js (frontend) and Django (backend). [\[code\]](#)
- **Computer Networks:** Implemented socket programming using Java for communication between systems. Built and simulated network architectures using NS-3 to understand network behaviors. Additionally, implemented TCP Adaptive Reno to explore congestion control algorithms. [\[code\]](#)

HONORS AND AWARDS

- **Dean's List Award** (2022, 2023)

TECHNICAL SKILLS

- **Languages:** Python, C/C++, JavaScript, Bash, JAVA, MySQL
- **Tools & Frameworks:** NS-3, Autopsy, Next, Oracle DBMS, Git, Django, LaTeX
- **Libraries:** OpenGL, Sklearn, Pandas, Matplotlib, Seaborn
- **Software:** Navicat, Wireshark, MS Office, Adobe Photoshop

REFERENCES

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