

# Kazi Ababil Azam

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## Research Interests

Intelligent Transportation Systems, Autonomous Vehicles, Cyber Physical Systems

## Work Experience

- Software Engineer**, Synesis IT PLC      *Software Development, React, WebRTC, TypeScript*      Dhaka, Bangladesh  
Jun 2024 to present

Contributed to the front-end development of **Convay**, a video conferencing web application. Analyzed WebRTC statistics to monitor the performance of meetings in real-time, identifying areas for optimization.
- Project Intern**, ERA InfoTech Limited      *Natural Language Processing, Data Analysis*      Dhaka, Bangladesh  
May 2023 to Jun 2023

Worked on an internship project focused on real-life business data analysis through unsupervised clustering by applying natural language processing techniques.

## Education

- Bachelor of Science (BSc) in Computer Science & Engineering**,  
Bangladesh University of Engineering & Technology (BUET)      *CGPA: 3.67/4.00*      Apr 2019 to Jul 2024

**Notable Courses:** Machine Learning, Microprocessor, Microcontroller & Embedded Systems, Compiler, Computer Networking, Simulation & Modelling, Computer Security, Computer Graphics, Artificial Intelligence

## Research Experience

- Towards Intelligent Traffic Signaling in Dhaka City Based on Vehicle Detection and Congestion Optimization**      Jun 2023 to Jun 2024

**Supervised by:** Dr. A. B. M. Alim Al Islam

Development of a system architecture for an intelligent traffic signaling system suited for the non-lane based, heterogeneous traffic scenario in Dhaka city. The system uses real-time traffic video feed to detect vehicles using object detection models in low resource environment and optimizes the signal cycle accordingly using multi-objective optimization algorithm. We physically implemented the proposed system architecture in an ensemble of IP Cameras and a Raspberry Pi to assess the feasibility at a nearby intersection.
- Evaluation Metrics for Generative Pedestrian Crossing Models in Simulation**      Jun 2023 to present

**Supervised by:** Golam Md Muktedir, Dr. A. B. M. Alim Al Islam, Dr. Mahmuda Naznin

Analysis of real-life pedestrian behavior data from datasets in order to formulate metrics to compare and evaluate generative pedestrian models in autonomous vehicle simulations. Data analysis, visualization, and statistical modeling are the primary tools used in this research.
- NHT1071: A Traffic Image Dataset for Non lane-based and Heterogeneous Traffic for Adaptive Traffic Signal Scheduling**      Jun 2023 to May 2024

**Supervised by:** Dr. A. B. M. Alim Al Islam, Masfiqur Rahaman

Dataset preparation for traffic signaling in context of the non-lane based, heterogeneous traffic of Dhaka city. The Non-lane based Heterogeneous Traffic dataset NHT1071 was prepared with 1071 traffic images from different locations in Dhaka city, taken in various times of the day. The dataset was prepared to train the object detection model for the intelligent traffic signaling system.

## Academic Projects

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### SyncInc

*Django, React, MUI, PostgreSQL*

[Github](#)

A web-based project and task delegation management software designed for organizations. Stack includes PostgreSQL as the database, Django for the backend, ReactJS with Material UI for the frontend, Django REST framework for API development, and Django Channels for real-time notifications.

### Laser Security System With Arduino

*Arduino, Cyber Physical Systems*

[Github](#) | [YouTube](#)

A project to control a laser security system with microcontrollers, where the AT-Mega32 unit manages the laser and the Arduino unit controls the alarm system and overall coordination.

### Ray Tracing and Illumination Using OpenGL

*C++, OpenGL*

[Github](#)

Implementation of an image generation pipeline using ray tracing and illumination techniques to create realistic images of geometric shapes (sphere, pyramid, cube) and a 2D plane using OpenGL.

### Implementation of a Congestion Control Algorithm for TCP Flows in ns-2

*ns-2*

[Github](#)

Implementation of a research paper on congestion control in ns-2 codebase, specifically in TCP to achieve improved throughput in wired and wireless networks.

### Compiler

*Bison, Flex*

[Github](#)

Built a compiler from scratch including steps for creating a symbol table, building a lexical analyzer, semantic analyzer, and generating intermediate code.

## Technical Skills

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**Languages:** C/C++, Python, Java, JavaScript, x86 Assembly, MySQL, Bison, Flex, Bash, Go, TypeScript

**Frameworks:** React, Bootstrap, Django, Express.js, Next.js

**Technologies:** LaTeX, Docker, Oracle DBMS, PostgreSQL, Git, Wireshark, Termius, Postman, OpenGL, ns-2

**Libraries:** OpenCV, PyAV, PyTorch, Keras, Pandas, Scikit-learn, SciPy, NLTK, Matplotlib, Seaborn, p5.js

## Competitions

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### 5th Place, IEEE CS, BUET presents "GameJam 2023"

*p5.js*

[Github](#)

5th position (out of 15 teams in the final round, 68 teams overall) by developing "Asteroids", a short, level based game using p5.js.

Jan 2023

## Leadership

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### Director of Events, BUET Cyber Security Club

[Link](#)

Promotion and organization of cybersecurity related events, seminars and both intra and inter-university Capture The Flag (CTF) competitions multiple times throughout the tenure.

Jun 2023 to Apr 2024

## Test Scores

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**TOEFL:** 113/120 (Reading: 29/30, Listening: 30/30, Speaking: 27/30, Writing: 27/30)