

# A. H. M. Osama Haque

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## Education

April 2019 - June 2024 **Bachelor of Science, Computer Science & Engineering, Bangladesh University of Engineering & Technology, Dhaka, Bangladesh, CGPA: 3.90 (out of 4.00)**

## Research Interest

Bioinformatics and Computational Biology, Machine Learning

## Research Experience

### Undergraduate Thesis

August 2023 - Present **Modeling Temporal Dependencies and Feature Interactions Reveal Novel Clinical and Molecular Insights into Alzheimer's Disease Progression**

Advisor **Dr. Md. Sohel Rahman**, Professor, Department of Computer Science & Engineering, Bangladesh University of Engineering & Technology

Collaborator **Md. Abul Hassan Samee**, Assistant Professor, Integrative Physiology, Baylor College of Medicine

Summary We analyzed top Alzheimer's disease prediction models from the TADPOLE Challenge to interpret their predictions. For the XGBoost model, we examined feature interactions using the TreeSHAP method. For more complex models like RNNs, we applied Integrated Gradients, which required modifications to the model architecture.

### Side Project

2021 - Present **Remodelling DhakaSIM, a traffic simulator based on heterogeneous non-lane based road network like Dhaka, incorporating side-friction elements**

Advisor Dr. A. B. M. Alim Al Islam, Professor, Department of Computer Science & Engineering, Bangladesh University of Engineering & Technology

Summary We collected Google Earth images at 100-meter intervals and gathered blockage width data for various side-friction elements. The blockage distributions were modeled as a sum of Gaussian distributions. By integrating these models into the DhakaSim simulator, we observed that traffic metrics such as average speed and flow rate closely matched actual data from Google Maps.

## Publications

2023 Ahmed, Sheikh Iftekhar, and AHM Osama Haque. "Microscopic Fungi Classification Using Vision Transformer Guided by Transfer Learning Approach." 2023 26th International Conference on Computer and Information Technology (ICCIT). IEEE, 2023. DOI: 10.1109/ICCIT60459.2023.10441604

2023 Sayem, Nafis Sadique, Sagor Chowdhury, AHM Osama Haque, Md Rostom Ali, Md Shahinur Alam, Sahabuddin Ahamed, and Chayan Kumer Saha. "IoT-based smart protection system to address agro-farm security challenges in Bangladesh." Smart Agricultural Technology 6 (2023): 100358 DOI: 10.1016/j.atech.2023.100358

## Work Experience

July 2024 - Present **Lecturer, Full-time, United International University, Dhaka, Bangladesh**  
Department of Computer Science & Engineering

June 2023 **Virtual Internship, ERA-Info Tech**, Dhaka, Bangladesh  
Business Data Analysis, Natural Language Processing

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## Undergraduate Projects

**Level4 Phylogenetic Tree Inference Using Deep Learning Methods (Machine Learning Laboratory Project)**

Summary The project aims to develop more efficient deep learning architecture for phylogenetic tree inference from MSA. We used and modified an existing model with simulated dataset (INDELible)

**Level4 HallSync (Software Development Laboratory Project)**

Summary A web platform for university hostel students. We implemented features for meal and seat management from the hall administrative perspective

**Level3 Wonder Hand (Microcontroller Project)**

Summary WonderHand is a hand gesture-based system to control household electrical appliances

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## Awards & Achievements

- 2022, 2023 **Champion Student Poster**, 9<sup>th</sup> & 10<sup>th</sup> International Conference on Networking, Systems and Security (NSysS)
- 2019 **22<sup>nd</sup> place** (Top 3 in Asia), Open Category, International Physics Brawl, Charles University(Czech Republic)
- 2018 **Khodadad Khan Memorial Prize in Mathematics (3<sup>rd</sup> place)**, Bangladesh Mathematical Olympiad (BdMO)
- 2018 **18<sup>th</sup> place**, National Round, Category-C, Bangladesh Physics Olympiad (BdPhO)
- 2018 **60% Scholarship Grant Winner**, ISCEA PTAK Case Competition

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## Service & Outreach

- 2019-2021 **Bangladesh Mathematical Olympiad (BdMO)**, Academic Team Member
- 2019-2023 **Bangladesh Physics Olympiad (BdPhO)**, Regional Examiner
- 2024 **Bangladesh Olympiad in Informatics**, National Round Exam Proctor

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## Technical Skills

**Programming Languages** C/C++, Python, Java, Javascript, x86 Assembly, MySQL, HTML, CSS, Bison, Flex  
**Tools & Frameworks** PyTorch, ReactJS, Git, Oracle DBMS, LaTeX  
**Libraries** Sklearn, Pandas, Matplotlib, Seaborn  
**Operating Systems** Windows, Linux

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## References

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

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