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🎓 gScholar

MAHERA ROKSANA ISLAM

Education

University of Dhaka

January 2020 – Ongoing

Bachelor of Science (BSc.) in Electrical and Electronic Engineering

Dhaka, Bangladesh

- CGPA: 3.66 (up to 6th semester). Last 2 semesters' GPA 3.81 – highest in my batch.
- Ranked in the **top 0.5%** amongst around 90,000 students in **the most competitive university admission exam in Bangladesh, 2019**.
- Member: IEEE SB DU, SIGHT, WIE, Computer Society, and DU Writer's Hub.
- Secretary at IEEE SIGHT (2024 onwards): Organized club meetings and activities. Arranged several skill-building workshops.
- Webmaster at IEEE SIGHT(2020-2024): Created and maintained the official website.
- Relevant Coursework: Digital Signal Processing, Industrial and Medical Instrumentation, Signal and Systems, Linear Algebra and Numerical Methods.

Research Interests

- Medical Image Analysis
- Computer Vision
- Generative Networks
- Image Segmentation

Publication

- **M. R. Islam**, A. M. Ferdous, S. Hossain, M. A. Rahman Ahad and F. Alnajjar, “**Optimizing Endotracheal Suctioning Classification: Leveraging Prompt Engineering in Machine Learning for Feature Selection**,” 6th International Conference on Activity and Behavior Computing (ABC), Japan, May 2024. [**IEEE**]

Research Experience

Undergraduate Thesis

January 2024 – Ongoing

University of Dhaka

Dhaka, Bangladesh

- **Title: Enhanced Segmentation of Microbial Images using Generative Adversarial Networks**
- **Supervisor(s):** Prof. Md Atiqur Rahman Ahad, Dr. Md. Zasim Uddin, Prof. Mosabber Uddin Ahmed.
- Developed a segmentation model based on customized CycleGAN architecture for enhanced segmentation of microbial artifacts across limited datasets.
- Currently running ablation tests to tune the model performance across several datasets.
- Explored various methods to train stable GANs on smaller datasets.
- Skills & Tools: Pytorch, Python (Conda), Bash

Research Assistant

January 2023 – June 2023

University of Dhaka

Dhaka, Bangladesh

- Worked with a research team on an unpublished literature review on neuromorphic computing. Investigated 100+ papers in this field.

Professional Experience

Data Science Intern

September 2023 – December 2023

iFarmer

Dhaka, Bangladesh

- Developed scripts to clean small and large datasets, visualize, and identify patterns on agricultural datasets to aid rural farmers.
- Used statistical and machine learning techniques (regression analysis, decision trees) to perform predictive analysis.
- Skills & Tools: Python (Numpy, Pandas, Scikit-learn, Seaborn, Regex, etc.), Bash, SQL

Data Analysis Intern (Part-time)

June 2023 – August 2023

Plexus Cloud

Dhaka, Bangladesh

- Developed and implemented SQL queries to extract, clean, and analyze large datasets from relational databases, and generated data-driven insights. Developed Bash scripts to streamline data extraction and loading from various sources into centralized repositories.
- Collaborated with Operations and Finance departments to understand data requirements and objectives. Helped to communicate data-driven insights using BI tools to upper-level managers.
- Skills & Tools: SQL, Bash, Python, MS Excel, BI Tools

Lab Instructor & Teaching Assistant

December 2019 – April 2023

Inspiration Coaching Center (Gulshan)

Dhaka, Bangladesh

- Led three weekly lab sessions for Cambridge A Level Biology students and two sessions for A Level Physics students.
- Guided students in mastering lab equipment usage and maintaining its functionality to support experiments and projects.
- Assisted with course preparation, exam question setting, schedule planning, and grading for Biology and Physics classes (Grades 9-12).
- Skills & Tools: MS Office

Selected Projects

Activity Recognition of Endotracheal Suctioning Procedure using Skeleton and Video Dataset with Generative AI

- **Supervisors:** Prof. Md Atiqur Rahman Ahad, Dr. Shahera Hossain, Dr. Fady Alhajjar
- Employed chain-of-thought prompting to several large language models (LLMs) to identify and select key features from the skeletal data.
- Implemented several classical machine and deep learning models to predict nursecare activities from extracted skeletal points data. Explored GANs to augment the skeletal dataset.
- Subsequently wrote a challenge paper and presented it at **6th International Conference on Activity and Behavior Computing (ABC)**, Japan, May 2024.
- Skills & Tools: Pytorch, Python (Conda, Colab), LLMs (GPT, Claude, Gemini, etc.)

EEG Classification Using LSTM models

- Developed LSTM models to analyze EEG time series data in predicting mental state of samples.
- Explored Bayesian optimization for hyperparameter tuning, PCA for dimensionality reduction methods and utilized Shapley additive explanations (SHAP) for feature selection.
- Skills & Tools: Pytorch, Python (Conda)

Archer: A Cost-Effective Single-Board Computer System

- Developed and deployed cost-effective single-board computer (SBC) systems to a rural school in Mymensingh, Bangladesh. Provided on-site training and continually offered remote and online assistance for maintenance.
- Secured project funding from **IEEE HAC**.
- Skills & Tools: OrangePi, Python, Linux, various open-source educational software

Beshuddho: A Tank-Based Water Purification System

- Designed and deployed a microcontroller-based UV filtration system to purify water in lower-income urban households of Dhaka.
- Secured project funding from **IEEE HAC**.
- Skills & Tools: Arduino, C/C++

NASA Space Apps Challenge: Global Nominee

- Worked on project to design 3D tools tailored to the unique conditions of Mars which was selected as the Champion from Dhaka region by BASIS, the local organizer of the competition.
- Skills & Tools: AutoCAD

Skills, Tools, and Frameworks

Frequently use: Pytorch, Python (OpenCV, Numpy, Pandas, Scikit-learn, SciPy, Regex, Matplotlib, Seaborn, Beautiful Soup, etc.), Bash, L^AT_EX.

Often use: SQL (PostgreSQL, T-SQL, Oracle DB), MATLAB, Docker, Git tools, BI/Office tools.

Know: C/C++, LTspice, AutoCAD, Cadence Virtuoso.

Miscellaneous

MOOCs:

- [Advanced Linear Algebra – edX](#)
- [Generative Adversarial Networks \(GANs\) Specialization – Coursera](#)
- [Structuring Machine Learning Projects – Coursera](#)
- [Machine Learning Specialization – Coursera](#)

References

Available upon request.

Prof. Md Atiqur Rahman Ahad, m.ahad@uel.ac.uk, University of East London, UK.

Prof. Mosaber Uddin Ahmed, mosabber.ahmed@du.ac.bd, University of Dhaka, Bangladesh.

Prof. Zasim Uddin, zasim@brur.ac.bd, Begum Rokeya University, Rangpur, Bangladesh.