MD RAKIB HASAN

Graduated from University of Dhaka, with 4 years of experience in data analytics and over 2 years of interdisciplinary research, addressing pressing social and environmental challenges of public health and sustainable development. Experienced in community engagement through 1.5 years of volunteer work with local stakeholders focused on mentorship and technical training for youth development.

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Project

Water Quality Forecasting Using Enhanced Deep Learning Architectures of Turag River

- Analyzed Turag River water and developed a novel method for modeling dissolved oxygen (DO) and biological oxygen demand (BOD) using stacked CNN, RNN, LSTM, and GRU models, in collaboration with *Atomic Energy Center.*
- Deep learning models outperformed machine learning models, improving accuracy by 3.88%, reducing errors by 7.41%, and increasing reliability by 95.56%.

Ground Water Arsenic Pollution Modeling Using Ensemble Techniques

- Analyzed groundwater from 909 wells to assess Arsenic pollution and developed a novel ensemble technique using multi scalar data fusion (soil, climatic, anthropogenic, satellite imagery) for prediction.
- The approach is expected to improve prediction accuracy by 5-10% compared to traditional deep learning models. The project was collaborated with *Dr. Anwar Zahid** from the *Institute of Water Modeling (IWM) & BWDB.*

Heavy Metal Contamination and Health Risk Assessment in Dhaka's Rivers

- Led a team to analyze seasonal heavy metal concentrations in water/sediments across 5 Dhaka rivers (Buriganga, Shitalakshya, Balu, Turag, Dhaleshwari) under supervision of *Dr Yeasmin Nahar Jolly**.
- Pb and Cu was primary pollutants, concentrations exceeding WHO/USEPA limits by up to 300%. Quantified ecological and health risks using indices and simulations, revealing moderate-to-high carcinogenic risks via ingestion/dermal exposure.

Soil Organic Carbon Dynamics Of Ganges Basin Delta By Spatial Deep Learning

- Collected Soil Samples from Sundarbans, Moribund, Mature & Active Delta of Ganges Basin of Bangladesh, analyzed physico-chemical characteristics under the supervision of *Dr Md Jashim Uddin**.
- The soil organic carbon analyzed from the lab was then mapped with satellite-imageries and historical weather data of 32 years and feed into Ensemble Deep Learning Model to predict spatial distribution of soil organic carbon sequestration.

Work Experience

Stanford University; **Code In Place 2025**

Section Leader — March 2025 - Present

- Led the class of 9 international students to teach CS106A/B program of Stanford University Syllabus. Provided detailed feedback and grading on assignments and exams.
- Collaborating with Dr. Chris Piech & Dr. Mehran Sahami to enhance course materials.

Atomic Energy Center; **Bangladesh Atomic Energy Commission**

Research Assistant — Mar 2024 - Nov 2024

- Developed and deployed deep learning models using TensorFlow and Scikit-Learn for water quality forecasting, enhancing environmental monitoring of the Turag, Buriganga, Shitalakshya, Dhaleshwari, and Balu rivers.
- Analyzed water pollution dynamics and documented findings in 7+ study, contributing to 10+ journal articles.

University of Dhaka; **Department of Soil, Water And Environment**

Research Assistant — Mar 2022 - Nov 2024

- Led 15+ analytical chemistry and deep learning projects to assess the impact of soil, sediment, and water quality on human health, analyzing over 500 samples across the Gangetic Delta. Contributed to 7+ peer-reviewed article.
- Used 5+ mathematical and statistical approaches to improve soil organic carbon (SOC) model accuracy by 15%.

Educational Qualification

University of Dhaka; ***B.Sc in Soil, Water & Environment*** — Jan 2020- Feb 2025

CGPA: 3.62/4.00;
Research Project: Health Risk Assessment from Heavy Metals in Dried Fish of Dhaka.

Higher Secondary Certificate (HSC) — Graduated in 2019

Letter Grade: A (Science), Government Bangla College

Secondary School Certificate (SSC) — Graduated in 2017

Letter Grade: A+ (Science), Lalmatia Housing Society School & College

Publications

Journal of Next Research, Elsevier (Under review)
Hasan, M. R., Rahman, A., Zubyer, S., & Jolly, D. Y. N. Comparative analysis of water quality forecasting of enhanced CNN, RNN, LSTM, GRU-based multivariate and univariate deep learning architectures for the urban Turag River.

Journal of Biological Science, University of Dhaka (Under review)
Uddin, M. J., Hasan, M. R., Arabi, F. Z., & Ali, A. Z. Spatial soil variability and carbon dynamics in the Moribund Delta of the Ganges of Bangladesh.

Journal of Environmental Geochemistry and Health, Elsevier
Rahman, A., Hasan, M. R., Zubyer, S., Jolly, Y. N., & Akter, S. Heavy metals and health risk assessment of Buriganga, Shityalakshya, Balu, Turag, Dhaleshwari river sediments and water around Dhaka.

Journal of Environmental Science Ecosystem, Elsevier
Hasan, M. R., Arabi, F. Z., Uddin, M. J., & Mohiuddin, A. S. M. The potential soil organic carbon stocks in Sundarbans tidal mangrove forest ecosystem of Bangladesh.

Areas of Expertise

SUSTAINABILITY & RESILIENCE
Disaster Risk Assessment & Monitoring
Climate Adaptation & Resource Management Workflow

PROJECT MANAGEMENT
NGO Program Coordination
Grant Reporting & Fundraising
Monitoring & Evaluation M&E

COMMUNITY ENGAGEMENT
Stakeholder Collaboration
Participatory Research
Fieldwork

SOCIAL IMPACT RESEARCH
Environmental Health Risk Assessment
Public Health Hazards Monitoring
Ground & Surface Water Quality
Variable Impact Monitoring

DATA FOR DEVELOPMENT
Real Time Monitoring (ArcGIS+Python)
Remote Sensing (Google Earth Engine)
Data analysis (Python, R, SQL)
GIS Mapping (ArcGIS, QGIS)

ADDITIONAL TECHNICAL SKILLS
Communication & Presentation
Data Handling (Pandas, Numpy)
Kobo Toolbox
ML/DL (TensorFlow, PyTorch)

Certifications

Mathematics for Machine Learning
Google IT Support Professional
Google IT Automation With Python
Certified Peer Reviewer Elsevier
Architecting Google Compute Engine
Google Cloud: Cloud Architect

Extracurricular activities

- *Secretary (Technical)*, **Geo-Biome Club; University of Dhaka**
- *Participant*, **Stanford University; Code In Place 2024**
- *Runnersup in Dhaka Division;* **BCB Young Tigers Cricket (2017)**

Interpersonal Skills

Communication Skills: Expert in communication with senior leadership and decision making teams.
Languages: English (Fluent), Bengali (Native), Hindi (Fluent)
Programming (4Y): Python, R, SQL, Bash
Database (3Y): PostgreSQL, MongoDB, MySQL, SQLite
Data Handling (4Y): Pandas, Numpy, A. Spark, Excel
Machine Learning (3Y): Scikit-Learn, TensorFlow, PyTorch, Spark MLib
Dashboarding / Plotting (3Y): PowerBI, Superset, Seaborn, Matplotlib
Operating Platform (3Y): Linux, Win Server Unix
App Development (1Y): Django, Flask

References

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