

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) CI/CD Tools (Docker, Kubernetes) 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 MLlib

Dashboarding / Plotting (3Y): PowerBI, Superset, Seaborn, Matplotlib

Operating Platform (3Y): Linux, Win Server Unix

App Development (1Y): Django, Flask

References

Dr. Md. Akhter Hossain Khan Vice Chancellor State University of Bangladesh vc@sub.edu.bd	Dr. ASM Mohiuddin Chairman Department of Soil Water And Environment University of Dhaka asm.mohiuddin@du.ac.bd	Dr. Yeasmin Nahar Jolly Chief Scientific Officer Atomic Energy Center jolly_tipu@yahoo.com
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