MD RAKIB HASAN

A dedicated graduate in Soil, Water, and Environment from the University of Dhaka, with 4 years of experience in data analytics and over 2 years of interdisciplinary research. Passionate about using data-driven insights to address pressing social and environmental challenges of water quality, public health, and sustainable development. Experienced in community engagement through 1.5 years of volunteer work, collaborating with local stakeholders to design and host workshops focused on mentorship and technical training for young technology enthusiasts.

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Areas of Expertise

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)

SUSTAINABILITY & RESILIENCE

Disaster Risk Assessment & Monitoring
Climate Adaptation Workflow
Resource Management

PROJECT MANAGEMENT

NGO Program Coordination
Grant Reporting Monitoring & Evaluation (M&E)

COMMUNITY ENGAGEMENT

Stakeholder Collaboration
Participatory Research
Fieldwork

ADDITIONAL TECHNICAL SKILLS

Communication & Presentation
Data Handling (Pandas, Numpy)
CI/CD Tools (Docker, Kubernetes)
ML/DL (TensorFlow, PyTorch)

Certification / Training

- Google IT Support Professional
- Google IT Automation With Python
- Google Cloud: Cloud Architect
- Mathematics for Machine Learning
- Architecting Google Compute Engine
- DataOps with Apache Iceberg using Spark, Nessie, and Dremio

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)**

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

Professional Experience

Stanford University; **Code In Place 2025**

Section Leader March 2025 - May 2025

- 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 2023 - 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.
- Used 5+ mathematical and statistical approaches to improve soil organic carbon (SOC) model accuracy by 15%. Contributed to 7+ peer-reviewed journal articles.

Project

Water Quality Modeling Using Enhanced CNN, RNN, LSTM, GRU of Turag

- 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 techniqueusing 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, BWDB on the project.

Interpersonal Skills

Languages
English (Fluent)
Bengali (Native)
Hindi (Fluent)

Communication Skills
Expert in communication with senior leadership and decision making teams.

Programming (4Y)

Python	R
SQL	Bash

Database (3Y)

PostgreSQL	MongoDB
MySQL	SQLite

Data Handling (4Y)

Pandas	Numpy
A. Spark	Excel

Dashboarding / Plotting (3Y)

PowerBI	Tableau
DataStudio	Superset
Seaborn	Matplotlib

Machine Learning (3Y)

Scikit-Learn	TensorFlow
PyTorch	Spark MLib

Cloud Platform (3Y)

AWS	GCP
Azure	DigitalOcean

Operating Platform (3Y)

Linux	Win Server
Unix	

App Development (1Y)

Django	Flask

Project

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

- Led a team to analyze seasonal heavy metal concentrations (Cr, Ni, Cu, As, Cd, Pb) in water/sediments across 5 Dhaka rivers (Buriganga, Shitalakshya, Balu, Turag, Dhaleshwari) under supervision of Dr Yeasmin Nahar Jolly*.
- Identified Pb and Cu as primary pollutants, with winter concentrations exceeding WHO/USEPA limits by up to 300% due to reduced runoff.
- Quantified ecological and health risks using advanced indices (Igeo, PLI) and Monte Carlo simulations, revealing moderate-to-high carcinogenic risks from Pb/As via ingestion/dermal exposure.

Soil Organic Carbon Dynamics Of Ganges Basin Delta By 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 soil organic carbon sequestration.
- The inter-relationship of variables was analyzed and findings are being compiled into a manuscript.

All Other projects can be found on Github

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.

References

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