Rahat Aayaz

Nationality: Bangladeshi **Date of birth:** 11/11/2000 **Phone:** (+880) 1521-575635

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RESEARCH EXPERIENCE

March 2024 – Present

Research Assistantship

Department of Building Engineering and Construction Management, Khulna University of Engineering & Technology (KUET), Khulna-9203, Bangladesh

Responsibilities: Research Article Drafting and Analysis, Lab Instruction, Machine Learning Analysis, Structural Designing.

January 2023 – February 2024

Undergraduate Thesis

Supervisor: Dr. Md. Habibur Rahman Sobuz | Associate Professor

Thesis Title: Enhancing High-Strength Concrete Incorporating Graphene and Hybrid Fibers: A Multi-Layered Laboratory Experiments and Machine Learning Analysis

EDUCATION AND CERTIFICATION

January 2006 – February 2016

Faizur Rahman Ideal Institute

Secondary School Certificate (SSC)

Field of study: Science

March 2016 – April 2018

Birshreshtha Noor Mohammad Public College

Higher Secondary Certificate (HSC)

Field of study: Science

December 2018 – March 2024

Khulna University of Engineering & Technology

Bachelor of Science in Engineering

Department: Building Engineering and Construction Management

Major: Structural & Materials Engineering

CGPA: 3.14/4.00 [Weighted Average Mark: 66.8%]

LIST OF PUBLICATIONS

Peer Reviewed Journals:

I. Md. Habibur Rahman Sobuz, **Rahat Aayaz,** SM Arifur Rahman, Faiz Uddin Ahmed Shaikh, Md. Kawsarul Islam Kabbo; Experimental and Microstructural Assessment of Hybrid Fiber Reinforced Graphene Nano-Engineered Concretes; **Journal of Materials Research and Technology, Elsevier Ed. (2024)** [A research collaboration with Curtin University, Australia] [doi.org/10.1016/j.jmrt.2025.03.003]

II. Md. Habibur Rahman Sobuz, Md. Mushfiqur Rahman, **Rahat Aayaz**, Wael S. Al-Rashed, Shuvo Dip Datta, Md. Abu Safayet, Md. Kawsarul Islam Kabbo, Masuk Abdullah; Combined Influence of Modified Recycled Concrete Aggregate and Metakaolin on High-Strength Concrete Production: Experimental Assessment and Machine Learning Quantifictions with Advanced SHAP and PDP Analyses; **Construction & Building Materials; Elsevier Ed. (2024)** [doi.org/10.1016/j.conbuildmat.2025.139897]

III. Asif Mahmud Momshad, Md. Hamidul Islam, Md. Habibur Rahman Sobuz, Shuvo Dip Datta, **Rahat Aayaz**, Md. Kawsarul Islam Kabbo, Md. Munir Hayet Khan; Assessing the Engineering Properties and Environmental Impact with Explainable Machine Learning analysis of Sustainable Concrete Utilizing Waste Banana Leaf Ash as a Partial Cement Replacement; **Cleaner Engineering and Technology; Elsevier Ed. (2024)** [doi.org/10.1016/j.clet.2025.100886]

IV. **Rahat Aayaz**, Israt Jahan; Application of Genetic Machine Learning for Predicting, Quantifying, and Optimizing the Strength of Fiber-Reinforced Concrete [Submitted-Streamlit.app]

V. **Rahat Aayaz**, Md. Habibur Rahman Sobuz, Md. Kawsarul Islam Kabbo, Muhammad Izzat Nor Ma'arof, Walid Mansour, SM Arifur Rahman, Aanika Roshni, Jannat Ara Jabin, Md. Munir Hayet Khan, Israt Jahan, Abu Sayed Mohammad Akid; A Novel Hybrid Machine Learning Based Prediction of Compressive strength of Natural Fiber Recycled Aggregate Concrete with Incorporating SHAP and PDP Analysis [In Progress]

Conference Proceedings:

I. **Rahat Aayaz**, Md. Habibur Rahman Sobuz, Sumaiya Mifra Akhter and Jannat Ara Jabin; Compressive Strength Prediction of High-Strength Graphene Reinforced Concrete using Machine Learning; **7th International Conference on Civil Engineering for Sustainable Development (ICCESD 2024)**, 7-9 February 2024, KUET, Khulna.

II. Israt Jahan, Md. Shahriar Hossain, **Rahat Aayaz;** Optimizing Small Spaces: A Comprehensive Study on Interior Design Challenges, Perceptual Experiences, and Innovative Solutions. **7th International Conference on Civil Engineering for Sustainable Development (ICCESD 2024)**, 7-9 February 2024, KUET, Khulna.

III. Md Al Toufiq Billah, Ayan Saha, **Rahat Aayaz;** Machine Learning Techniques to Predict Performance of Fiber-Infused Self-Compacting Concrete with SHAP & PDP Analysis; **7th International Conference on Advances in Civil Engineering (ICACE 2024)**, 12-14 December 2024, CUET, Chittagong.

IV. Aanika Roshni, **Rahat Aayaz;** An investigation for detecting plastic waste using automated river mapping with unmanned aerial vehicles (UAVs) and deep learning algorithms in Buriganga river; **9th International Conference on Sustainable Solutions for Waste Management in Developing Countries (WasteSafe 2025),** 22-23 February 2025, KUET, Khulna. [Under Review]

AFFILIATIONS

Journal Reviewer

i. Engineering Applications of Artificial Intelligence (Elsevier)
ii. Case Studies in Construction Materials (Elsevier)
iii. Journal of Building Engineering (Elsevier)
iv. Materials and Structures (Springer)
v. Ain Shams Engineering Journal (Elsevier)
vi. Journal of Structural Design and Construction Practice (ASCE)

Associate Member Institute of Engineers, Bangladesh (IEB)

PROJECTS

GitHub Repository Hybrid Machine Learning Prediction of Concrete Properties, including SHAP & PDP analysis

Description: Codes for hybrid machine learning model development to predict Natural Fiber Recycled Aggregate Concrete (NFRAC) compressive strength. Additionally, the algorithm incorporates SHAP and PDP analysis for model interpretation and optimized mix design.

Dataset Contribution

i. Natural fiber-recycled aggregate concrete
Mendeley Data, V1, DOI: 10.17632/7chtgrwkv3.1

ii. Recycled aggregate-metakeolin enhanced concrete Compressive Strength DataSet
Mendeley Data, V1, DOI: 10.17632/zs42wxbvyf.2

LANGUAGE PROFICIENCY

- Bangla (Native Language)
- English (Fluent working proficiency)

STANDARDIZED TEST SCORES

IELTS (International English Language Testing System)	Listening: 8.0	
1st October, 2024	Reading: 7.0	Overall: 7.0
TRF number: 24BD506889AAYR001A	Writing: 6.5	
	Speaking: 6.0	

TECHNICAL SKILLS

Structure Analysis and Designing	ETABS, Autodesk Robot, STAAD.Pro
Foundation Analysis and Designing	SAFE, STAAD Foundation
Finite Element Analysis	ANSYS, Abaqus
Computer-Aided Designing	AutoCAD, Sketchup
Building Information Modeling	Autodesk Revit, Autodesk Navisworks
Microsoft Office Suite	Word, Excel, PowerPoint, Publisher, Visio, Project
Architectural Visualization	TwinMotion, Lumion
Programming Language	C++, Python, MATLAB
Data analysis and Graphing	OriginPro

TECHNICAL COURSE CERTIFICATIONS

October 2024	**Unsupervised Learning, Recommenders, Reinforcement Learning** **Coursera (offered by Stanford University)** **Skills:** Unsupervised learning techniques (K-Means, PCA, Hierarchical Clustering), Recommender systems (Collaborative Filtering, Matrix Factorization), Reinforcement learning (Q-learning, MDPs)

August 2024	**Advanced Learning Algorithms** **Coursera (offered by Stanford University)** **Skills:** Deep learning architectures (CNNs, RNNs, LSTMs), Advanced optimization techniques, Unsupervised learning (GMMs, PCA), TensorFlow/PyTorch implementation.
June 2024	**Supervised Machine Learning: Regression and Classification** **Coursera (offered by Stanford University)** **Skills:** Linear and logistic regression, classification algorithms, model training and evaluation, bias-variance tradeoff, feature engineering, regularization techniques (L1, L2), and Python programming for ML.
January 2024	**Technical Support Fundamentals** **Coursera (offered by Google)** **Skills:** Troubleshooting and Problem Solving, Operating System Basics, Networking Fundamentals, Command Line Interface (CLI) Proficiency.
October 2020	**Financial Markets** **Coursera (offered by Yale University)** **Skills:** Understanding Financial Markets and Instruments, Risk Management and Behavioral Finance, Investment Strategies and Portfolio Management, Market Regulation, Historical Financial Crises.

ACADEMIC PROJECTS

August 2023-December 2023	**Building Information Modeling** Implementing BIM Tools in a 6-Storied Residential Building. Skills: Implemented BIM tools like REVIT, ROBOT, and Autodesk Navisworks.
April 2023-June 2023	**Analysis and Design of Tall Buildings** Analysis and Design of a 10-Storied Residential Building. Skills: Structural analysis through ETABS
May 2022-June 2022	**High Rise Building Analysis** Structural and architectural design analysis of Hearst Tower, 300 W 57th St, New York, NY 10019, USA.

	Skills: Advanced 2D modeling using AutoCAD, Presentation (Canva, Microsoft PowerPoint), Parking layout analysis.
August 2022-February 2023	**Architectural design: Landscape design** Resolving urban dilemmas and renovation of Shonadanga Bus Terminal, Khulna, Bangladesh. Skills: Advanced 2D and 3D modeling (AutoCAD, SketchUp), Real-time 3D visualization (TwinMotion), Presentation (Canva, Microsoft PowerPoint), Transportation and parking layout.
April 2023-June 2023	**Architectural design: Interior design** Interior renovation of KUET cafeteria. Skills: Advanced 2D and 3D modeling (AutoCAD, SketchUp), Real-time 3D visualization (TwinMotion), Proficiency in Canva and Microsoft PowerPoint, Ergonomics and space layout.

REFERENCES

Dr. Md. Habibur Rahman Sobuz

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CERTIFICATION STATEMENT

I, Rahat Aayaz, hereby certify that the information provided in this document is true and accurate to the best of my knowledge. For the latest revision of this document kindly click here.