

Md. Muhtashim Shahrier

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PROFILE

Transportation engineering graduate from BUET exploring the use of machine learning, optimization and uncertainty modeling to improve urban mobility systems. I believe thoughtful research can create real impact, and I'm specially interested in how intelligent systems can promote equity, resilience, and access in transportation. I enjoy working on interdisciplinary problems and hope to contribute meaningfully to solving real-world challenges through my work.

EDUCATION

Bachelor of Science, Civil Engineering

02/2020 – 03/2025

Bangladesh University of Engineering and Technology (BUET)

Major in Transportation Engineering, Minor in Structural Engineering

CGPA: 3.96/4.00 (Top 5 out of 211 students)

RESEARCH INTERESTS

Machine learning for urban mobility, uncertainty-aware modeling of transportation systems, and data-driven optimization for resilient and equitable transport solutions.

RESEARCH EXPERIENCE

Undergraduate Thesis 🔗

Application of Chaos Theory to Evaluate Pedestrian Behavior Using Deep Learning-Based Video Analytics in Different Diurnal Variations

Supervisor: Dr. Md. Hadiuzzaman

Developed a deep learning and chaos-theoretic framework to evaluate pedestrian behavior across diurnal variations in Bangladeshi traffic; trained a custom YOLOv8 model for nighttime road user detection, applied DeepSORT to extract pedestrian trajectories, and analyzed movement patterns using Lyapunov Exponent and Approximate Entropy to quantify behavioral unpredictability.

Publications

- **Shahrier, M. M.**, Haque, N., & Hadiuzzaman, M. (Planned submission, 2025). *A Supervised Learning Framework to Classify Pedestrian Chaos Under Varying Lighting and Traffic Conditions*. To be submitted to the Transportation Research Board (TRB) 105th Annual Meeting, Washington, D.C.
- **Shahrier, M. M.**, Anjum, S., Haque, N., & Hadiuzzaman, M. (Planned submission, 2025). *Reinforced Modeling of Motorcycle Crash Severity: Tackling Underreporting through Questionnaire-Based Insights*. To be submitted to the Transportation Research Board (TRB) 105th Annual Meeting, Washington, D.C.
- **Shahrier, M. M.**, Haque, N., & Hadiuzzaman, M. (Under review). *Deep Learning-Based Nighttime Road Users Detection and Tracking in Urban Mixed Traffic Environments of Bangladesh*. International Conference on Civil Engineering Research & Innovations (ICCEI).
- Iftakhar, M. S., **Shahrier, M. M.**, Raihan, M. A., & Hadiuzzaman, M. (Under review). *Identifying Factors Contributing to Heavy Vehicle Crash Severity in Bangladesh Through Comparative Severity Modeling*. International Conference on Civil Engineering Research & Innovations (ICCEI).

AWARDS

- **Dean's Award** – Outstanding academic performance in every academic year.
- **BUET Academic Merit Scholarship** – Awarded in each term for academic excellence.
- **International Youth Math Challenge 2023** – Silver Medalist.

ACADEMIC PROJECTS

Capstone Project: Multifaith Center Development in Azimpur, Dhaka

Led a 7-member team in a multidisciplinary capstone project for the development of a Multifaith Center. Conducted feasibility studies, detailed architectural and structural design, environmental and cost assessments, and performed a Traffic Impact Assessment using ITE trip generation methods, Highway Capacity Manual (HCM) based LOS analysis, and pedestrian flow modeling.

Trip Generation Modeling (Term Project)

Modeled student trip generation in Dhaka using linear regression; performed data preprocessing, variable selection, and evaluation with Python and Excel.

Warren Truss Bridge Analysis (MATLAB Term Project)

Simulated Warren truss under moving loads using custom MATLAB code; visualized tension/compression forces and solved internal forces via matrix methods.

INDEPENDENT PROJECTS

Synthetic Four-Step Travel Demand Modeling in Python

Built a custom Python-based four-step travel demand model for a synthetic city, implementing all components from scratch without simulation tools to reinforce transportation planning concepts.

Bus Route Access Heatmap of Dhaka

Developed a GIS-based heatmap of Dhaka's bus service coverage by scraping route data, geocoding stops, clustering services, and overlaying population density to identify underserved areas.

Facility Location Optimization on a Synthetic Grid Using Monte Carlo Simulation

Implemented a Monte Carlo simulation on a 5x5 grid with random demand points and uncertain travel times to identify robust facility locations, using custom Python code without specialized optimization tools.

Road Segment Importance Prediction with Graph Neural Networks (GNNs)

Built a full GNN pipeline to classify road segment importance in the Dhaka road network (~250k edges) using OpenStreetMap data. Engineered structural features, assigned multi-class labels from highway tags, and trained both MLP and GCN (GCNConv) models using PyTorch Geometric.

TECHNICAL SKILLS

- **Programming Languages & Tools:** Python, MATLAB, C++, C
- **Data Science & ML Libraries:** NumPy, Pandas, Roboflow
- **Computer Vision & Deep Learning:** YOLOv8, DeepSORT, OpenCV
- **Modeling & Simulation:** OSMnx, NetworkX
- **Geospatial & Engineering Software:** QGIS, AutoCAD, ETABS, SAP2000