Md. Muhtashim Shahrier

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PROFILE

Transportation engineering graduate from BUET, specializing in machine learning and uncertainty modeling for 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 complex, 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 195 students)

RESEARCH INTERESTS

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

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.

AWARDS

Dean's Award
Recognized for outstanding academic performance in each academic year of undergraduate study.

BUET Academic Merit Scholarship
Awarded for outstanding academic performance in each term of undergraduate study.

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 in Azimpur, Dhaka. Conducted feasibility studies, detailed architectural and structural design, environmental and cost assessments, and performed a Traffic Impact Assessment using ITE trip generation methods, 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 5×5 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 GNN-based pipeline to predict road segment importance in Dhaka using OSM data, with feature engineering, multi-class labeling, and PyTorch Geometric training on a city-scale graph.

TECHNICAL SKILLS

- **Programming Languages & Tools**: Python, MATLAB, C++, C, LaTeX
- **Data Science & ML Libraries**: NumPy, Pandas, scikit-learn, Seaborn, PyTorch, TensorFlow, Roboflow
- **Computer Vision & Deep Learning**: YOLOv8, DeepSORT, OpenCV
- **Modeling & Simulation**: SUMO, OSMnx, NetworkX
- **Geospatial & Engineering Software**: QGIS, AutoCAD, ETABS, SAP2000
- **Applications**: Object detection and tracking, supervised learning, regression modeling, transportation simulation, chaos analysis

ORGANIZATIONAL & LEADERSHIP ACTIVITIES

Member 01/2023 – 03/2025
Satyen Bose Science Club, BUET

Class Representative 02/2020 – 01/2021
Department of Civil Engineering, BUET
- Coordinated academic and administrative activities during transition to online learning.
- Acted as liaison between students and faculty during the pandemic.