Md Muhtashim Shahrier

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○ github.com/muhtashimshahrier

PROFILE

Transportation engineering graduate from BUET with a focus on machine learning, optimization, and uncertainty-aware modeling of urban mobility systems. Passionate about advancing resilient and equitable transport solutions through interdisciplinary research.

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 (5th out of 211 students)

RESEARCH INTERESTS

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

RESEARCH EXPERIENCE

Research Assistant   11/2023 – Present
Department of Civil Engineering, BUET
Supervisor: Dr. Md. Hadiuzzaman

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 Bangladesh; trained a YOLOv8 model for nighttime detection, applied DeepSORT for trajectory extraction, and quantified unpredictability using Lyapunov Exponent and Approximate Entropy.

Publications

- **Shahrier, M. M.**, Haque, N., Raihan, M. A., & Hadiuzzaman, M. (2025). *Modeling chaotic pedestrian behavior using chaos indicators and supervised learning.* Submitted for presentation at the 105th Annual Meeting of the Transportation Research Board and publication in *Transportation Research Record*: *Journal of the Transportation Research Board.* (Under review).
- Arif, S. S., **Shahrier, M. M.**, Haque, N., Raihan, M. A., & Hadiuzzaman, M. (2025). *CNN-based framework for pedestrian age and gender classification using far-view surveillance in mixed-traffic intersections.* Submitted for presentation at the 105th Annual Meeting of the Transportation Research Board and publication in *Transportation Research Record*: *Journal of the Transportation Research Board.* (Under review).
- Anjum, S., **Shahrier, M. M.**, Haque, N., Raihan, M. A., & Hadiuzzaman, M. (2025). *Reinforced modeling of motorcycle crash severity*: *Tackling underreporting through questionnaire-based insights.* Submitted for presentation at the 105th Annual Meeting of the Transportation Research Board and publication in *Transportation Research Record*: *Journal of the Transportation Research Board.* (Under review).

- Rucunuzzaman, M., Hasanat-E-Rabbi, S., **Shahrier, M. M.**, Raihan, M. A., & Hadiuzzaman, M. (2025). *Segment-level modeling of explanatory factors of crash frequency on undivided two-lane highways using zero-inflated negative binomial models.* Submitted for presentation at the 105th Annual Meeting of the Transportation Research Board and publication in *Transportation Research Record*: *Journal of the Transportation Research Board.* (Under review).
- **Shahrier, M. M.**, Haque, N., & Hadiuzzaman, M. (2025). *Deep learning-based nighttime road users' detection and tracking in urban mixed traffic environments of Bangladesh.* Submitted to the International Conference on Civil Engineering Research & Innovations (ICCEI 2025). (Under review).
- Iftakhar, M. S., **Shahrier, M. M.**, Raihan, M. A., & Hadiuzzaman, M. (2025). *Identifying factors contributing to heavy vehicle crash severity in Bangladesh through comparative severity modeling.* Submitted to ICCEI 2025. (Under review).
- **Shahrier, M. M.** (2025). *Learning road segment importance in data-scarce urban networks using graph neural networks*: *A case study on Dhaka.* Submitted to ICCEI 2025. (Under review).
- **Shahrier, M. M.**, Iftakhar, M. S., Hadiuzzaman, M., & Haque, N. (2025). *Challenges and policy directions for battery-powered rickshaws in Dhaka's urban mobility landscape.* Submitted to ICCEI 2025. (Under review).

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 to design a Multifaith Center in Dhaka, conducting feasibility studies, structural design, and a Traffic Impact Assessment using ITE trip generation and HCM-based LOS analysis.

INDEPENDENT PROJECTS

Road Segment Importance Prediction with Graph Neural Networks (GNNs) ⊘
Built a city-scale GNN pipeline on Dhaka's road network (~250k edges), demonstrating improved accuracy over MLP baselines for road segment importance classification.

Bus Route Access Heatmap of Dhaka ⊘
Developed a GIS-based heatmap of Dhaka's bus service coverage by integrating scraped route data and population density, identifying underserved areas.

Facility Location Optimization on a Synthetic Grid Using Monte Carlo Simulation ⊘
Simulated facility location decisions under uncertain travel times using Monte Carlo methods on synthetic grids, illustrating robustness of optimized placements.

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