TASMIAH HAQUE

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Professional Summary

AI/ML researcher with 3+ years of experience building real-time intelligent systems at the intersection of video analytics, probabilistic modeling, and anomaly detection. *Ph.D. candidate* (*expected April 2027*) specializing in generative time-series models, motion keypoint prediction, and bandwidth-efficient inference pipelines. Author of peer-reviewed journal and conference papers, including a NeurIPS 2026 WiML workshop paper on real-time fall detection; proven track record in both academic research and industrial settings.

Education

Ph.D. in Industrial Engineering *Expected Apr 2027*
West Virginia University, Morgantown, WV
- *Dissertation:* Generative Sequence Forecasting for Real-time Decision Systems Under Deployment Constraints

M.S. in Industrial Engineering *May 2023*
West Virginia University, Morgantown, WV
- *Thesis:* A Hybrid Physics-Infused LSTM for Marine Vessel Tracking via AIS Data

B.Sc. in Industrial & Production Engineering *Apr 2019*
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

Technical Skills

Machine Learning | Time-series forecasting, probabilistic modeling, generative models (VAE, Normalizing Flows), MCMC, anomaly detection

Computer Vision / Video AI | Motion keypoint prediction, keypoint-based video motion transfer, real-time video synthesis, bandwidth-efficient AI pipelines

Frameworks & Languages | Python, PyTorch, PyTorchTS, TensorFlow, R, MATLAB, C

Infrastructure & MLOps | Kubernetes, NVIDIA RTX / A10 / A100 GPU training & inference, Linux, Windows

Industrial & Operations | SAP, CPLEX, Arena simulation, Minitab, AutoCAD, SolidWorks

Research Experience

Graduate Research Assistant — Data Science *Aug 2023 – Present*
School of Mathematical and Data Sciences, West Virginia University • Morgantown, WV

- Achieved up to $20\times$ **bandwidth savings** over conventional video streaming, $2\times$ beyond existing keypoint pipelines, while running in real time at 23–37 FPS, by forecasting future motion keypoints with a Variational Recurrent Neural Network (VRNN) inside a video motion-transfer pipeline for conferencing, VR, and remote monitoring.
- Improved the **diversity–fidelity ratio** of generated video motion by up to 37% with a training-free, inference-time MCMC refinement for GRU–Normalizing Flow models, with no retraining.
- Benchmarked **generative and recurrent forecasting models** on 3 video datasets in PyTorch/PyTorchTS, for accuracy–diversity analysis across video synthesis and industrial anomaly detection tasks; which guides model choice depending on the specific application for real-time motion transfer.
- Delivered a privacy-preserving **real-time fall-detection pipeline** on unsupervised motion keypoints that, under occlusion, raised F1 by a median 29 points over supervised pose (OpenPose) while using about $100\times$ less compute and transmitting 35–$52\times$ less data than standard video (accepted at **WiML @ NeurIPS 2026**).
- Extending the fall-detection framework to **multimodal sensing**, fusing video motion keypoints with wearable IMU signals for more robust fall detection (ongoing).
- Served as Graduate Teaching Assistant for three undergraduate Data Science courses, including providing instructional support on fundamental machine learning concepts and methods for Statistical Machine Learning.
- Mentored four undergraduate researchers (August 2024 – present) through literature review, experimental design, PyTorch implementation, and writing; one of the students is a co-author on the fall-detection paper.

Graduate Researcher & Teaching Assistant *Aug 2021 – May 2023*
Dept. of Industrial and Management Systems Engineering, West Virginia University • Morgantown, WV

- Developed a physics-infused LSTM for **marine vessel track association** using AIS data in TensorFlow, achieving 95% average prediction accuracy.
- Served as Graduate Teaching Assistant for four undergraduate Industrial Engineering courses, including designing and delivering weekly R labs for Advanced Analysis of Engineering Data, covering regression, hypothesis testing, and statistical process control.

Industry Experience

Graduate Engineering Trainee — Inbound Logistics *Dec 2019 – Mar 2021*
Unilever Bangladesh Ltd. • Chittagong, Bangladesh

- Managed inventory safety and quality for 400+ SKUs in a **high-volume manufacturing environment**, aligning SAP stock levels with production schedules.
- Recovered **$6,000 in packaging materials** through a relabeling initiative and optimized storage layout and transportation costs to meet on-time-in-full delivery targets.

Selected Publications

Full list on Google Scholar

- **Haque, T.**, Kosinski, J., Al-Mamun, M.A., & Das, S. (2026). Unsupervised keypoints for real-time fall detection: Comparative analysis under real-world conditions with predictive bandwidth reduction. *Women in Machine Learning (WiML) Workshop, NeurIPS 2026* (accepted, **poster**); under review at *Scientific Reports*. [arXiv]
- **Haque, T.**, Syed, M.A.B., Jeong, B., Bai, X., Mohan, S., Paul, S., Ahmed, I., & Das, S. (2026). Towards efficient real-time video motion transfer via generative time series modeling. *Multimedia Tools and Applications*, 85(2), 51. ***Oral presentation**, INFORMS Annual Meeting 2026.*
- **Haque, T.** & Das, S. (2025). Inference-time stochastic refinement of GRU-Normalizing Flow for real-time video motion transfer. *59th Asilomar Conference on Signals, Systems, and Computers*, 1313–1318 (**poster**).
- **Haque, T.**, Syed, M.A.B., Das, S., & Ahmed, I. (2024). Advancing marine surveillance: A hybrid approach of physics-infused neural network for enhanced vessel tracking using AIS data. *Journal of Marine Science and Engineering*, 12(11), 1913. ***Oral presentation**, IISE Annual Conference 2023*.
- Bai, X., **Haque, T.**, Mohan, S., Cai, Y., Jeong, B., Halasz, A., & Das, S. (2024). Enhancing bandwidth efficiency for video motion transfer applications using deep learning based keypoint prediction. *EANN 2024*, Springer, 134–151.

Service & Leadership

- **Judge**, WVU Undergraduate Research Symposium (2026)
- **Committee Member** (Program Coordinator), Bangladeshi Students Association, West Virginia University (2023-2024)

Certifications & Awards

- **Certificate of Achievement** — Track Winner: Health Innovation + Cyberbiosecurity, Student Research & Technology Poster Competition at Mountain State Cyber Summit 2026 (2026)
- **Six Sigma Green Belt Certificate** — IISE (2023)
- **Supply Chain Director's Award** — Unilever Bangladesh Ltd. (2020)