FAHIM AHMED ZAMAN

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CORE COMPETENCIES

- Machine Learning & Deep Learning (CNNs, Transformers, GANs, Diffusion Models, LLMs)
- Computer Vision & Medical Image Processing
- Segmentation, Explainable AI, Adversarial Robustness
- Software Development (Python, C++, MATLAB, R)

EXPERIENCE

Postdoctoral Scholar August 2024 - Present
Department of ECE, University of Iowa *Iowa city, IA, USA*

- Developed a **latent diffusion model** for **fast and accurate medical image segmentation**, improving computational efficiency and robustness across multi-class datasets. The model achieved state-of-the-art accuracy in 3 different datasets with only 2 sampling steps.
- Created an **explainable AI (XAI) pipeline** for cardiovascular disease diagnosis, leveraging deep learning visualization and optical flow algorithms to enhance interpretability.
- Designed a **video-to-text generative model** integrating **Vision Transformers and LLMs** to automate medical report generation.

Graduate Research Assistant August 2018 - July 2024
Department of ECE, University of Iowa *Iowa city, IA, USA*

- **Medical image segmentation:** Developed a score-based surface cold diffusion model for enhanced multi-surface segmentation accuracy.
- **Segmentation quality assessment (SQA):** Designed and validated **three novel deep learning-based models** for:
  · Identifying erroneous segmentation regions via surface optimization.
  · Quantifying patch-wise segmentation errors using GAN-based reconstruction-regression models.
  · Detecting adversarial attacks using GAN-based surface region reconstruction.
- **Cardiovascular disease diagnosis:** Applied **spatiotemporal deep learning** to improve differential diagnosis of **Takotsubo Syndrome (TTS)** using non-invasive imaging techniques.

System Engineer December 2014 - March 2017
Department of Regional Operations, Grameenphone LTD. *Dhaka, Banglaedsh*

- Led a **3G rollout project**, deploying **108 BTS** within a **3-month span**.
- Coordinated a **network migration project** from **TDM to IP transmission**, optimizing communication infrastructure.
- Managed **network fault handling & vendor coordination** to ensure optimal service performance.

EDUCATION

Ph.D. in Computer Engineering
University of Iowa, USA | July 2024 | GPA: **3.79/4.00**
M.S. in Computer Engineering
University of Iowa, USA | December 2022 | GPA: **3.79/4.00**
B.S. in Electrical & Electronics Engineering
Islamic University of Technology, Bangladesh | November 2014 | GPA: **3.80/4.00**

TECHNICAL STRENGTHS

Programming Languages	Python, MATLAB, R, C, C++, Arduino, AvrStudio5
ML & CV Libraries	TensorFlow, PyTorch, Scikit-learn, ITK, VTK
Circuit Design & Simulation	Simulink, Proteus, PSpice, Microwind, Calculux
Tools	Git, Microsoft Office, Latex

GRANT WRITING EXPERIENCE

- **NIH R01 Grant (2024):** "Deep Hybrid Medical Image Analysis: Beyond Pure Deep Learning"
- **NIH R01 Grant (2023):** "Implications of Spatiotemporal Deep Learning Neural Networks in Echocardiographic Diagnosis and Prognostication of Takotsubo Syndrome"

SELECTED PUBLICATIONS

[Google Scholar Link]

• **Zaman, F.A.**, Zhang, L., Zhang, H., Sonka, M. and Wu, X., 2023. Segmentation quality assessment by automated detection of erroneous surface regions in medical images. Computers in Biology and Medicine, p.107324.

• **Zaman, F.A.**, Roy, TK., Sonka, M., Wu, X.. "Patch-wise 3D Segmentation Quality Assessment Combining Reconstruction and Regression Networks", Journal of Medical Imaging, 10(5), 054002 (8 September 2023).

• **Zaman, F.A.**, Jacob, M., Chang, A., Liu, K., Sonka, M. and Wu, X., 2025. Latent Diffusion for Medical Image Segmentation: End to end learning for fast sampling and accuracy. arXiv preprint. arXiv:2407.12952

• **Zaman, F.A.**, Jacob, M., Chang, A., Liu, K., Sonka, M. and Wu, X., 2024. Surf-CDM: Score-Based Surface Cold-Diffusion Model for Medical Image Segmentation. 2024 IEEE International Symposium on Biomedical Imaging (ISBI), Athens, Greece, pp. 1-5.

• **Zaman, F.A.**, Wu, X., Xu, W., Sonka, M., Mudumbai, R., 2023. "Trust, but Verify: Robust Image Segmentation using Deep Learning", accepted in the Asilomar Conference on Signals, Systems and Computers.

• **Zaman, F.**, Ponnapureddy, R., Wang, Y.G., Chang, A., Cadaret, L.M., Abdelhamid, A., Roy, S.D., Makan, M., Zhou, R., Jayanna, M.B. and Gnall, E., 2021. Spatio-temporal hybrid neural networks reduce erroneous human "judgement calls" in the diagnosis of Takotsubo syndrome. EClinicalMedicine, 40, p.101115.

• **Zaman, F.**, Isom, N., Chang, A., Wang, Y.G., Abdelhamid, A., Khan, A., Makan, M., Abdelghany, M., Wu, X. and Liu, K., 2023. Deep Learning from Atrio-Ventricular Plane Displacement in Patients with Takotsubo Syndrome: Lighting Up the Black-Box. European Heart Journal-Digital Health, p.ztad077.

• **Zaman, F.A.**, Alam, W., Roy, T.K., Chang, A., Liu, K. and Wu, X., 2023. Diagnosis Of Takotsubo Syndrome By Robust Feature Selection From The Complex Latent Space Of DL-based Segmentation Network. 2024 IEEE International Symposium on Biomedical Imaging (ISBI), Athens, Greece, pp. 1-5.

• **Zaman, F.A.**, Alam, W., Roy, T.K., Chang, A., Liu, K. and Wu, X., 2023. Diagnosis Of Takotsubo Syndrome By Robust Feature Selection From The Complex Latent Space Of DL-based Segmentation Network. 2024 IEEE International Symposium on Biomedical Imaging (ISBI), Athens, Greece, pp. 1-5.

HONORS AND AWARDS

- **Ballard & Seashore Dissertation Fellowship,** University of Iowa
- Invited talk at the IIBI Seminar on "Segmentation Quality Assessment", University of Iowa, IA - 2021.
- **Invited Talk (ECE Graduate Seminar, 2023):** "GPT-4: Capabilities, Implications, and Challenges"
- **National Runners-up:** Line-Follower Robotics Competition (Mecceleration 2014)