FAHIM AHMED ZAMAN

🌐 Portfolio   in LinkedIn   📖 Google Scholar   GitHub   ✉ fahim.eee10@gmail.com   📞 (319)·400·0559

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 across multi-label datasets. The model achieved state-of-the-art accuracy in 3 different datasets with only 2 sampling steps, improving efficiency by by 99%.
- Created an explainable AI (XAI) pipeline for cardiovascular disease diagnosis, leveraging deep learning visualization and optical flow algorithms to enhance interpretability and improving the accuracy by 31% over human physicians.
- 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 that achieved 94% segmentation accuracy in echocardiogram dataset.
- *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 for differential diagnosis of Takotsubo Syndrome (TTS) using non-invasive imaging techniques by improving 23% diagnosis accuracy over human physicians.

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.
- Xie, H., Pan, Z., Zhou, L., **Zaman, F.A.**, Chen, D.Z., Jonas, J.B., Xu, W., Wang, Y.X. and Wu, X., 2022. Globally optimal OCT surface segmentation using a constrained IPM optimization. Optics Express, 30(2), pp.2453-2471.
- **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.**, Wu, X., Xu, W., Sonka, M., Mudumbai, R., 2023. "Trust, but Verify: Robust Image Segmentation using Deep Learning", 2023 57th Asilomar Conference on Signals, Systems, and Computers, Pacific Grove, CA, USA, 2023, pp. 1070-1074.

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)