Fazle Rafsani

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Tempe, AZ - 85281, USA

About

I am a third-year computer science Ph.D. student specializing in computer vision, deep learning, and medical imaging. My research focuses on developing generative and multimodal models to address challenging imaging problems. I also explore large language models and diffusion-based architectures to advance cross-modal understanding and improve healthcare outcomes through AI.

Education

- **Arizona State University** *Aug 2023 - present*
  PhD in Computer Science Tempe, USA
  - **GPA: 4.00/4.00**
  - Research Area: Deep Learning, Computer Vision, Medical Imaging, Foundation Models
  - Advisor: Dr. Teresa Wu, Dr. Baxin Li
- **Bangladesh University of Engineering and Technology (BUET)** *May 2022*
  Bachelor of Science in Computer Science and Engineering Dhaka, Bangladesh
  - Grade: 3.54/4.00

Publications

C=Conference, J=Journal, A=Abstract

[C.1] **Rafsani, F.**; Shah, J.; Chong, C. D.; Schwedt, T. J.; & Wu, T. (2025). **DinoAtten3D: Slice-Level Attention Aggregation of DinoV2 for 3D Brain MRI Anomaly Classification**. In *Proceedings of the IEEE/CVF International Conference on Computer Vision **(ICCV)** Workshop on Anomaly Detection with Foundation Models*.

[C.2] Che, Y.; **Rafsani, F.**; Shah, J.; Siddiquee, M. M. R.; & Wu, T. (2025). **AnoFPDM: Anomaly Detection with Forward Process of Diffusion Models for Brain MRI**. In *Proceedings of the Winter Conference on Applications of Computer Vision **(WACV)** Workshops*.

[J.1] **Rafsani, F.**; Sheth, D.; Che, Y. et al (2025). **Leveraging multi-modal foundation model image encoders to enhance brain MRI-based headache classification.** In *Sci Rep 15, 33256 (2025).* [IF 4.0]

[J.2] Zaman, Z.; Rahman, S.; **Rafsani, F.** et al. (2023). **DeepVRM: Deep Learning Based Virtual Resource Management for Energy Efficiency.** In *Journal of Network and Systems Management.* [IF 4.3]

[J.3] Siddiquee, M. M. R.; **Rafsani, F.**; Wu, T.; Chong, C. D.; Schwedt, T. J.; & Li, B. (2025). **AUCp: Pseudo-AUC for Inference Model Selection with Unlabeled Validation Data in Abnormality Detection**. *Submitted to the IEEE **Transactions of Medical Imaging** Journal.* [IF 10.1]

[A.1] **Rafsani, F.**; Sheth, D.; Che, Y.; Shah, J.; Siddiquee, M. M. R.; Chong, C.; Nikolva, S.; Dumkrieger, G.; Li, B.; Wu, T.; and Schwedt, T. (2025). **Using Large-scale Contrastive Language-Image Pre-training to Maximize Brain MRI-Based Headache Classification.** In *American Academy of Neurology Annual Meeting 2025*

Experience

- **Wu Lab, Arizona State University [🌐]** *January 2024 - Present*
  Graduate Research Associate Tempe, AZ
  - Conducting research at the ASU-Mayo Center for Innovative Imaging, focusing on AI-driven medical imaging.
  - Designed and implemented deep learning pipelines for segmentation, anomaly detection, and multi-modal **brain MRI analysis.**
  - Developed and adapted **foundation and generative models** for advancing anomaly detection in neurological imaging.
  - Authored and co-authored publications in leading venues, including **WACV, ICCV, and Nature Scientific Reports.**
- **Arizona State University [🌐]** *August 2023 - present*
  Graduate Teaching Associate Tempe, AZ
  - Served as a Teaching Associate for CSE 110, a programming-based computer science course
  - Delivered lectures across four sections, engaging and managing a cohort of over 350 students.
- **IQVIA [🌐]** *August 2022 - July 2023*
  Software Engineer AI/ML Dhaka, Bangladesh
  - Developed Python-based web and ML frameworks with healthcare data for a recommendation system.
  - Contributed to the "**Next Best Actions**" project, which won the **Stevie Award in 2023**.
- **ICT Cell BUET [🌐]** *December 2021 - August 2022*
  Software Developer Dhaka, Bangladesh
  - Worked as a full-stack software engineer. Built responsive and interactive system using **Django, React.js** integrated with **PostgreSQL** ensuring seamless user experience.
  - Successfully delivered a comprehensive solution to support secured university financial oversight through a scalable and user-friendly system.

Research Projects

- **Multi-Modal Foundation Model Based Headache Detection** *January 2024 - February 2025*
  Funded by Department of Defence, USA
  - Developed **multi-modal** BioMedCLIP-based deep learning method for headache detection.
  - Achieved superior performance compared to existing methods for headache detection. Improved the headache detection results by 5-10% for each subtype of headache.
- **Biomarker Signature to Predict the Persistence of Post-Traumatic Headache** *January 2024 - present*
  Funded by NIH, USA
  - Developed a **foundation model**-based deep learning method to identify biomarkers from MRI images responsible for post-traumatic headache.
  - Applied GradCAM for biomarker extraction, enabling visualization of relevant areas in MRI images and enhancing interpretability for medical professionals.
- **Diffusion Model-Based Anomaly Segmentation Using Brain MRI** *January 2024 - August 2024*
  Funded by NIH, USA
  - Developed AnoFPDM, a fully weakly-supervised diffusion-based anomaly detection framework that eliminates reliance on pixel-level labels during tuning.
  - Introduced dynamic selection of noise scale and threshold per input, and aggregated sub-anomaly maps across diffusion steps to better highlight anomalies.
  - Achieved **80% Dice** score on BraTS21 and ATLAS v2.0, surpassing the state-of-the-art weakly-supervised baselines in brain MRI anomaly segmentation.
- **Automated Thyroid Nodule Segmentation from CT Scans for Overdiagnosis Reduction** *March 2025 - present*
  - Implemented and compared **MONAI**-based segmentation models (SegResNet, Auto3DSeg) and foundation model **MedSAM** on thyroid CT scans to automate nodule delineation.
  - Aimed to reduce overdiagnosis of thyroid cancer by improving lesion segmentation accuracy and reproducibility.
  - Achieved 74% Dice score with MONAI models, while MedSAM with **manual prompts** reached 80% average Dice, outperforming baseline methods.

Skills

- **Programming Languages:** Python, Java, C, C++, HTML/CSS, JavaScript, PHP, SQL
- **Python Libraries:** Numpy, Pandas, Scikit-learn, Matplotlib, OpenCV, Pilow, Axios, Keras
- **Developer Tools:** Github, Git, Heroku, Docker, Kubernetes, SSH, AWS, S3, Azure, GCP
- **Data Science & Machine Learning:** PyTorch, Keras, TensorFlow, HuggingFace, MONAI, GradCAM
- **Web Frameworks:** Laravel, Django, Nodejs, React, Express, Nextjs
- **Databases:** Oracle, MySQL, FireBolt, SnowFlake, MongoDB

Awards

- **Gerald Farin Memorial Fellowship** *2024-2025, 2025-2026*
  Arizona State University
  - Awarded for academic excellence and research potential in the field of computer vision.
- **Graduate College Travel Award** *April, August 2025*
  Arizona State University
  - Awarded to present my research work at the annual meeting of the American Academy of Neurology 2025
- **SCAI Conference Award** *August 2025*
  School of Computing and Augmented Intelligence, ASU
  - Awarded to present my research work at the ICCV 2025.
- **Dean's List** *2021*
  Bangladesh University of Engineering and Technology
  - Recognized for outstanding academic performance in the final year of undergraduate studies.
- **Finalist, Blockchain Olympiad** *2021*
  ICT Division Bangladesh
  - Achieved finalist position in the Blockchain Olympiad organized by ICT Division of Bangladesh.

Services

- **Journal Reviewer**
  Journal of Headache and Pain