Rabeya Tus Sadia

rabeya-tus-sadia Google Scholar rumi07.github.io

Education

- **3rd year PhD student, Department of Computer Science** — **University of Kentucky**
  Lexington, KY, USA — *August 2023 – Present*
  GPA: 4.0/4.0
- **BSc in Computer Science & Engineering** — **Rajshahi University of Engineering & Technology**
  Rajshahi, Bangladesh — *2021*
  (10th out of 120)

Professional Experience

- **University of Kentucky** — **Lexington, KY, USA**
  Graduate Teaching Assistant, Department of Computer Science — *January 2025 – Present*
  - Instructor for CS215 - Introduction to Programming Design, Abstraction, and Problem Solving.
- **University of Kentucky** — **Lexington, KY, USA**
  Graduate Research Assistant, Internal Medicine & Division of Biomedical InformaticsAugust 2023 – Present
  - Research focuses on image quality enhancement, generative models, and causality-aware methods for medical imaging and spatial transcriptomics, leveraging generative AI, foundation models, and large vision-language models (VLMs). Worked on causality-aware imputation for spatial omics datasets. Currently working on causality-aware multimodal foundation models and agent-based causal language modeling.
  - Worked in a collaboration with the **Biomedical Optics Lab** and **Gluck Equine Research Centre**.
- **Green University of Bangladesh** — **Dhaka, Bangladesh**
  Lecturer, Department of Computer Science and Engineering January 31, 2022 – Present (on study leave)
  - Taught courses in Data Communication, Database Systems, and Information System Design.
  - Supervised undergraduate projects and theses.
  - Advised undergraduate students on academic and career matters.

Selected Publications

[1] **Rabeya Tus Sadia**, M. A. Ahamed, and Q. Cheng, "**CausalGeD: Blending Causality and Diffusion for Spatial Gene Expression Generation**." Accepted at KDD 2025(Oral+Poster).

[2] **Rabeya Tus Sadia**, J. Zhang, and J. Chen, "**Multiscale Latent Diffusion Model for Enhanced Feature Extraction from Medical Images**," 2024.

[3] **Sadia, Rabeya Tus**, J. Chen, and J. Zhang, "**CT image denoising methods for image quality improvement and radiation dose reduction**," *Journal of Applied Clinical Medical Physics*, vol. 25, no. 2, p. e14270, 2024.

[4] **Rabeya Tus Sadia**, M. A. Ahamed, and M. A. Hossain, "**Multiple weather scene detection utilizing the EfficientNet family**," in *6th International Conference on Computer, Communication, Chemical, Materials and Electronic Engineering(IC4ME2)*, pp. 140–145, 2021. (Published).

[5] **Rabeya Tus Sadia**, M. A. M. Hasan, and A. Sayeed, "**Classification of skin lesion using transfer-learned CNN and feature concatenation**," in *6th International Conference on Engineering Research, Innovation and Education (ICERIE)*, pp. 89–94, 2021. (Published).

[6] M. A. Ahamed and **Rabeya Tus Sadia**, "**Examining the behaviour of state-of-the-art convolutional neural networks for brain tumor detection with and without transfer learning**," *arXiv preprint arXiv:2206.01735*, 2022. (Preprint).

Medium Blogs

- How to connect text and images:
  Understanding Zero-shot Learning and **Understanding Zero-shot learning with the CLIP model**
- Understanding graph neural network with hands on example:
  Part-1 & **Part-2**
- **Deep learning for Classifying Audio of Infant crying with hands-on example**
- **Medical Image Denoising with CNN**

Projects

- **Multiscale Latent Diffusion Model for TR-LSCI Enhancement**
  Contributed with Biomedical Optics Lab, University of Kentucky.
  - **Description:** Developed LTDiff++, to denoise and enhance time-resolved laser speckle contrast imaging (TR-LSCI) of cerebral blood flow.
  - **Contributions:** Led model design, latent space optimization, and validation on phantom and in-vivo datasets, improving depth and temporal resolution.
  - **Technologies:** PyTorch, DDPM, UNet++, SPAD cameras.
- **Horse CT Bone Segmentation and Analysis**
  Contributed with Gluck Equine Research Centre, University of Kentucky
  - **Description:** Developed segmentation pipelines using SAM and SAM2 models to segment horse leg CT bones and extract detailed bone cluster features.
  - **Contributions:** Led data preprocessing, segmentation optimization, feature extraction, and achieved high segmentation accuracy across varied anatomical regions.
  - **Technologies:** Python, SAM/SAM2, PyTorch, DICOM processing, clustering, feature analysis.
- **Online Book Shopping** (Project for CSE 3200: Software Development Project-II)
  Supervisor: Prof. Nazrul Islam Mondal, Department of CSE, RUET, February 2016
  - **Description:** A web application that enables users to purchase books online. The system includes features such as book search, order history management, user authentication, and email verification via RESTful web API services.
- **Building a Chatbot using Python**
  - **Description:** An AI-based chatbot designed to interact with users in natural language.

Achievements

- **Selected for KDD'25 student Travel Award**
- Champion of Huwaei Seeds for the Future 2020

Services

- Reviewer of IJACTM21- International Journal of Advanced Computer Technology and Management.

Programming Skills

- Proficient in Python, C++, C and Java
- Significant Experience with Python
- Machine Learning & Deep Learning tools & framework PyTorch, Keras & scikit-learn