Md Marufi Rahman

3400 Joyce ln,Denton,Texas-76207
mdmarufirahman@my.unt.edu ⋄ mdmarufirahman.github.io

Education

University of North Texas *Aug 2019 - present*
Ph.D., Computer Science and Engineering GPA: 3.85/4.0

Rajshahi University of Engineering and Technology *March 2013 - Dec 2017*
B.Sc., Electronics and Telecommunication Engineering GPA: 3.32/4.0

Research Interests

Medical image analysis, Computer vision, Deep learning, Artificial intelligence

Publications

1. Y. Li, J. Baik, **M. M. Rahman**, I. Anagnostopoulos, R. Li, and T. Shu, "Pareto optimization of CNN models via hardware-aware neural architecture search for drainage crossing classification on resource-limited devices", *in Proceedings of the SC '23 Workshops of The International Conference on High Performance Computing, Network, Storage, and Analysis*, Denver CO USA, 2023.
2. **M. M. Rahman**, JH Oh, Wallapak Tavanapong and Piet C. de Groen, "Content Based Image Retrieval Using Depth Maps for Colonoscopy Images", *2023 In Proceedings of the 16th International Joint Conference on Biomedical Engineering Systems and Technologies*, Lisbon, 2023, pp. 301-308.
3. **M. M. Rahman**, JH Oh, Wallapak Tavanapong, Johnny Wong and Piet C. de Groen, "Automated Bite-block Detection to Distinguish Colonoscopy from Upper Endoscopy using Deep Learning", *2021 16th International Conference on Visual Computing (ISVC)*, virtual, 2021, pp. 216-228.
4. **M. M. Rahman**, M. K. Hosain, S. Ahmed and M. W. A. Azad, "Investigation of coil designs for transcranial magnetic stimulation on realistic head model", *2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC)*, Dhaka, 2017, pp. 279-283.
5. **M. M. Rahman**, J. R. Mou, K. Tara and M. I. Sarkar, "Real time Google map and Arduino based vehicle tracking system", *2016 2nd International Conference on Electrical, Computer and Telecommunication Engineering (ICECTE)*, Rajshahi, 2016, pp. 1-4.

Employment History

Graduate Teaching Assistant/Fellow, CSE, UNT August 2019 - Present

- Worked for courses CSCE 4350(Fundamentals of Database Systems), CSCE5390 (multimedia computing), CSCE5350 (fundamentals of databases), CSCE5050 (Application of Cryptography), CSCE4355 (Database Administration), CSCE2110 (computing foundation), CSCE1030(problem solving using C++).
- Created assignments, graded papers, proctored exams, and mentored students with courseworks.

Graduate Research Assistant, CSE, UNT Aug 2020- May 2022

- Worked on image analysis for the gastrointestinal videos dataset project.
- Explored various key challenges in medical video dataset.
- Deployed several deep learning as well as traditional image processing techniques to tackle those challenges.

Undergraduate Research Assistant, ETE, RUET Dec 2016- Jul 2018

- Worked on the project "Design and analysis of transcranial magnetic coils to stimulate brain neurons for various neurological disorders."
- My solution increased value of magnetic field with focality as is 1.21E-5 T.

Technical Skills

Programming	C++, Python, R, Matlab, SQL, CUDA
Framework and Library	TensorFlow, Keras, PyTorch, OpenCV, NLTK, Pandas, Numpy, Scipy
Specializations	Generative AI, LLM, Model Optimization, GPU Acceleration
Cloud Platform	AWS, GCP, Azure
Additional Skill	Git, Docker, CI/CD, Agile/Scrum

Research Projects

Predicting unexplored area inside the colon May 2023 - Present

- Developing techniques to overcome limitations in traditional colonoscopy cameras, predicting unexplored areas which will reduce misdiagnoses, and improve patient outcomes.
- Utilizing motion detection, deep learning algorithms and some novel approaches for 2D images as an alternative to 3D reconstruction.

The (body) language of social interactions Jan 2023 - May 2023

- Led research on the H20 Social Interaction Dataset, dividing it into posture, motion, and social interaction images, with the goal of accurately and efficiently predicting social interactions.
- Developed and optimized multiple multi-label CNNs and object detection models, achieving an impressive 83% F1 accuracy when trained with multilabel data.

Similarity detection of colonoscopy medical images using depth map Jan 2022 - Jan 2023

- Addressed the ineffectiveness of traditional low-level visual feature-based similarity measures for colonoscopy images.
- Proposed a solution with an F1 accuracy range of 86.8% to 92.5% based on surface structures.

Predict Colorectal cancer cells using Single Cell Trio-seq data Aug 2021 - Jan 2022

- Processed extensive methylation data and integrated biological information with gene expression and DNA methylation data to predict colorectal cancer cells.
- Collaborated with cross-functional teams to generate novel ideas.
- Achieved a precise prediction of colorectal cancer cells from tumors and metastases, with a macro average accuracy of 85%, highlighting a comprehensive and effective approach to cancer prediction using deep learning.

Distinguishing Colonoscopy from Upper Endoscopy April 2020 - May 2021

- Developed a solution for a fundamental step in automated quality feedback systems by successfully distinguishing between colonoscopy and upper endoscopy based on the detection of bite-block appearance.
- Utilized innovative approaches, including Hue-Saturation information and Convolutional Neural Networks (CNNs), achieving a high precision (0.78) and sensitivity (0.81), showcasing practical application and impact in the medical imaging domain.