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Mukaffi Bin Moin

Research Interests

Natural Language Processing, Large Language Models, Computer Vision, Vision Language Models, Large Vision Models, Generative Adversarial Network, Multimodal Deep Learning, Medical Image Analysis, Explainable Artificial Intelligence, Machine Learning, Deep Learning & its applications.

Education

July 2019 to Dec 2023 **Ahsanullah University of Science and Technology**, Dhaka-1208, Bangladesh
B. Sc. in Computer Science and Engineering

CGPA: 3.563 on a scale of 4.00 (40th in Merit Position Among 133 Students)

Undergraduate Thesis Title: Generative Adversarial Networks for Crop Disease: A Case Study with Potato Disease Classification and Instance Segmentation

Supervisor: Dr. Mohammad Shafiul Alam, Professor, Dept. of CSE. AUST

Work Experience

March 2024 to Present **Machine Learning Engineer**, **ANTT Robotics Ltd**, Dhaka, Bangladesh.

- Designed and implemented a chatbot that utilizes LLMs to generate code for Arduino, ESP32, and Raspberry Pi platforms.
- Developed solutions for time series analysis and predictive maintenance across various appliances, enhancing performance and reliability.
- Implemented computer vision solutions for Automatic Number Plate Recognition (ANPR) and dynamic toll price calculation using YOLOv8.
- Currently designing an AI-based surveillance system utilizing CCTV footage for advanced monitoring and analysis.
- Supervised an intern for four months and served as the Team Lead for the AI team, overseeing project development and team performance.

Publications (* denotes equal contribution)

Conferences

- **Mukaffi Bin Moin**, Fatema Tuj Johora Faria, Swarnajit Saha, Bushra Kamal Raza, and Mohammad Shafiul Alam. **“Exploring Explainable AI Techniques for Improved Interpretability in Lung and Colon Cancer Classification.”** arXiv preprint arXiv:2405.04610 (2024). [[Presented at ICCNet 2024](#)] [[Preprint Link](#)]
- Fatema Tuj Johora Faria*, **Mukaffi Bin Moin***, Rabeya Islam Mumu, Md Mahabubul Alam Abir, Abrar Nawar Alfay, and Mohammad Shafiul Alam., **“Motamot: A Dataset for Revealing the Supremacy of Large Language Models Over Transformer Models in Bengali Political Sentiment Analysis,”** 2024 IEEE Region 10 Symposium (TENSYMP), New Delhi, India, 2024, pp. 1-8, doi: 10.1109/TENSYMP61132.2024.10752197.
- **Mukaffi Bin Moin**, Pronay Debnath, Usafa Akther Rifa, Rijeet Bin Anis. **“Assessing the Level of Toxicity Against Distinct Groups in Bangla Social Media Comments: A Comprehensive Investigation.”** arXiv preprint arXiv:2409.17130 (2024). [[Presented at ICITA 2024](#)] [[Preprint Link](#)]
- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Ahmed Al Wase, Md Rabius Sani, Khan Md Hasib, and Mohammad Shafiul Alam. **“Classification of potato disease with digital image processing technique: a hybrid deep learning framework.”** In 2023 IEEE 13th Annual Computing and Communication Workshop and Conference (CCWC), pp. 0820-0826, doi: 10.1109/CCWC57344.2023.10099162.

- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Md Mahfuzur Rahman, Md Morshed Alam Shanto, Asif Iftekher Fahim, and Md Moinul Hoque. **“Uddesho: An Extensive Benchmark Dataset for Multimodal Author Intent Classification in Low-Resource Bangla Language.”** arXiv preprint arXiv:2409.09504 (2024).
[\[Presented at ICITA 2024\]](#) [\[Preprint Link\]](#)
- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Asif Iftekher Fahim, Pronay Debnath, and Faisal Muhammad Shah. **“Unraveling the Dominance of Large Language Models Over Transformer Models for Bangla Natural Language Inference: A Comprehensive Study.”** arXiv preprint arXiv:2405.02937 (2024).
[\[Presented at ICCNet 2024\]](#) [\[Preprint Link\]](#)
- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Asif Iftekher Fahim, Pronay Debnath, and Faisal Muhammad Shah. **“BanglaMemeEvidence: A Multimodal Benchmark Dataset for Explanatory Evidence Detection in Bengali Memes.”** [\[Under Review in an A* Rank Conference\]](#)
- Saidur Rahman Sujon, Ahmadul Karim Chowdhury, Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, and Faisal Muhammad Shah. **“Tackling Hallucination in Bengali NLP: Enhancing Paraphrase Generation, Reading Comprehension, and Formal Application Writing Using LLMs with Few-Shot Learning, Fine-Tuning, and RAG.”** [\[Under Review in an A* Rank Conference\]](#)

Journals

- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Zayed Hasan, Md Arafat Alam Khandaker, Niful Islam, Khan Md Hasib, and M. F. Mridha. **“MultiBanFakeDetect: Integrating Advanced Fusion Techniques for Multimodal Detection of Bangla Fake News in Under-Resourced Contexts.”**
[\[Under Review in International Journal of Information Management Data Insights \(Q1\)\]](#)
- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Pronay Debnath, Asif Iftekher Fahim, and Faisal Muhammad Shah. **“Explainable Convolutional Neural Networks for Retinal Fundus Classification and Cutting-Edge Segmentation Models for Retinal Blood Vessels from Fundus Images.”** arXiv preprint arXiv:2405.07338 (2024). [\[Under Review in Journal of Visual Communication and Image Representation \(Q1\)\]](#) [\[Preprint Link\]](#)
- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Ahmed Al Wase, Mehidi Ahmmed, Md Rabius Sani, and Tashreef Muhammad. **“Vashantor: a large-scale multilingual benchmark dataset for automated translation of bangla regional dialects to bangla language.”** arXiv preprint arXiv:2311.11142 (2023).
[\[Under Review in Neural Computing and Applications \(Q1\)\]](#) [\[Preprint Link\]](#)
- Fatema Tuj Johora Faria, **Mukaffi Bin Moin**, Busra Kamal Raza, Swarnajit Saha, Md. Mahfuzur Rahman, Khan Md Hasib, and M. F. Mridha. **“BanglaCalamityMMD: A Comprehensive Benchmark Dataset for Multimodal Disaster Identification in the Low-Resource Bangla Language.”**
[\[Under Review in International Journal of Disaster Risk Reduction \(Q1\)\]](#)
- Mohammad Shafiul Alam*, Fatema Tuj Johora Faria*, **Mukaffi Bin Moin***, Ahmed Al Wase, Md Rabius Sani, and Khan Md Hasib. **“PotatoGANs: Utilizing Generative Adversarial Networks, Instance Segmentation, and Explainable AI for Enhanced Potato Disease Identification and Classification.”** arXiv preprint arXiv:2405.07332 (2024). [\[Under Review in Journal of Intelligent Information Systems \(Q2\)\]](#) [\[Preprint Link\]](#)

Ongoing Research Projects

- Bornali: A Comprehensive Study on Bangla Text to Image Generation
- Mental Health Advice Generation in Low-Resource Bangla Language
- BanglaMedQA: A Comprehensive Benchmark Dataset for Medical Question Answering
- Image-to-Text Generation for Agricultural Disease Diagnosis and Recommendations

Technical Skills

- **Programming Language:** Python, Java, C++
- **Database:** MySQL, PostgreSQL, MongoDB
- **Deep Learning Frameworks:** TensorFlow, Keras, PyTorch
- **Cloud Services:** AWS, Amazon SageMaker, Amazon EC2
- **Others:** LangChain, Prompt Engineering, OpenCV

Awards & Achievements

5th August, **Poster Presentation**

- 2023 ○ “**Classification of Potato Disease with Digital Image Processing Technique: A Hybrid Deep Learning Framework**”, secured 1st position in “**RESEARCH SYMPOSIUM 2023: AN INTRA-AUST RESEARCH EXHIBITION**” organized by AUST Research and Publication Club. [[Poster Link](#)]

References

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