Hasmot Ali

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Research Interest

- **NLP**: Multimodal Data Integration for Healthcare and Medical Applications, Automatic Tools Generation for LLM Agents, Agentic Application, Risk Prediction, and Vulnerability Detection on AI-Generated Code, Ethical and Privacy Considerations in Data-Driven Research.
- **Vision**: Multimodal Large Language Model and Zero-Shot Learning, 3D Scene Reconstruction, Multimodal Clustering, Physics Guided Image Clustering, Diffusion's for Synthetic Data Generations, Complex Scene Understanding, Human Activity Recognition, Detection of Microscopic Objects.

Education

- **Daffodil International University** — Dhaka, Bangladesh
  Bachelor of Science in Computer Science and Engineering; CGPA: 3.85/4.00 — *May 2017 - April 2021*
  Courses: *Computer Architecture, Operating Systems, Discrete Mathematics, Data Structures, OOP, Algorithms, Numerical Methods, Compiler Design, Computer Graphics, Artificial Intelligence, Machine Learning, Intro to Robotics.*
  Honors: *Magna Cum Laude*

Work Experience

- **Silicon Orchard Ltd, Dhaka, Bangladesh** — Silicon Orchard Ltd
  Senior Machine Learning Engineer (Full-time) — *December 2024 - Present*
  - Working on multimodal clustering on USA aircraft and physics guided rule based image clustering.
  - Working with diffusion for synthetic data generation from reference image & knowledge graph information.
  - Working on anomaly detection of Satellite Imagery using Siamese Networks and GANs.
  - Working on building a pipeline for task-specific automated Tools Generation for Multimodal LLM Agents.
  - Working on LLM agent for stock market analysis and prediction as well as the ability to generate knowledge graph triples from news articles.
  - Working on Cyber Vulnerability Index and risk prediction on US vulnerable sectors.
  - Working on predicting risk and vulnerability of AI-generated code.
- **Apurba Technologies Ltd, Dhaka, Bangladesh** — Apurba Technologies Ltd
  Machine Learning Engineer (Full-time) — *February 2022 - December 2024*
  - Trained word-level segmentation and recognition model for printed and handwritten OCR images.
  - Developed Multimodal LLM to integrate with RAG system for enhanced information retrieval and generation.
  - Deployed multi-framework models for inference serving on both CPU and GPU servers on Amazon EC2.
  - Implemented Triton Inference Server for better GPU utilization, Batching and Multi-Model Execution.
  - Utilized ONNX to achieve framework independence and applied Quantization to reduce inference latency.
  - Dockerized multi-container applications to streamline deployment and scalability across environments.
  - Developed scalable backend APIs using FastAPI for large-scale applications for robust RESTful services.
  - Conducted R&D on the latest NLP and Computer Vision technology advancements for system enhancement.
  - Worked on Document Layout Analysis for document layout understanding and reconstruction.
  - Managed a team of 6 Research Assistants from 2 R&D Lab as part of an Industry-Academia Collaboration.
- **Apurba-DIU Research and Development Lab, Dhaka, Bangladesh** — ADRL
  Research Assistant (Full-time) — *April 2021 - January 2022*
  - Led a team of 90 Data Processing Engineers in preparing, cropping, and annotating Bangla OCR data from Computer Compose, Letterpress, and Typewriter documents, optimizing quality and efficiency.
  - Researched Kinesiology on hand movement during Bengali handwriting and its implications for computer science research in gesture recognition and handwriting analysis.
  - Designed a pipeline for data annotation having features like folder structure, cropping, segmentation, and annotation that optimized the time and resources by almost 70%.

Publications

1. Hasmot Ali, AKM Shahariar Azad Rabby, Md Majedul Islam, A.K.M. Mahamud, Nazmul Hasan, and Fuad Rahman. 2023. Gold Standard Bangla OCR Dataset: An In-Depth Look at Data Preprocessing and Annotation Processes. In Proceedings of the 2023 Conference on Empirical Methods in Natural Language Processing: Industry Track (EMNLP), pages 460–470, Singapore. Association for Computational Linguistics.
2. Ali, Hasmot, Md Fahad Hossain, Md Mehedi Hasan, and Sheikh Abujar. "Covid-19 Dataset: Worldwide Spread Log Including Countries First Case and First Death." Data in Brief 32 (2020): 106173.
3. Ali, Hasmot, Md Fahad Hossain, Shaon Bhatta Shuvo, and Ahmed Al Marouf. "Banglasenti: A Dataset of Bangla Words for Sentiment Analysis." In 2020 11th International Conference on Computing, Communication and Networking Technologies (ICCCNT), pp. 1-4. IEEE, 2020.
4. Rabby, A. K. M., **Hasmot Ali**, Md Majedul Islam, Sheikh Abujar, and Fuad Rahman. "Enhancement of Bengali OCR by Specialized Models and Advanced Techniques for Diverse Document Types." In Proceedings of the IEEE/CVF Winter Conference on Applications of Computer Vision, pp. 1102-1109. 2024.
5. A. S. A. Rabby, **H. Ali**, M. M. Islam and F. Rahman, "Versatile Bengali OCR: Document Analysis Technique for Varied Document Styles and Content," 2023 IEEE International Conference on Big Data (BigData), Sorrento, Italy, 2023, pp. 1965-1969, doi: 10.1109/BigData59044.2023.10386582.
6. Haque, Mohd Ariful, Justin Williams, Sunzida Siddique, Md Hujaifa Islam, **Hasmot Ali**, Kishor Datta Gupta, and Roy George. "Advanced Tool Learning and Selection System (ATLASS): A Closed-Loop Framework Using LLM." arXiv preprint arXiv:2503.10071 (2025). Accepted on CISOSE 25.
7. Hasan, Md Mehedi, **Hasmot Ali**, Md Fahad Hossain, and Sheikh Abujar. "Preprocessing of Continuous Bengali Speech for Feature Extraction." ICCCNT, pp. 1-4. IEEE, 2020.
8. Hossain, Md Fahad, Md Mehedi Hasan, **Hasmot Ali**, Md Rahmatul Kabir Rasel Sarker, and Md Toukirul Hassan. "A Machine Learning Approach to Recognize Speakers Region of The United Kingdom from Continuous Speech Based on Accent Classification." In 2020 11th International Conference on Electrical and Computer Engineering, pp. 210-213. IEEE, 2020.
9. Sarker, Md Rahmatul Kabir Rasel, Nasrin Akter Borsha, Md Sefatullah, Azizur Rahman Khan, Somaiya Jannat, and **Hasmot Ali**. 'A Deep Transfer Learning-Based Approach to Detect Potato Leaf Disease at an Earlier Stage'. In 2022 Second International Conference on Advances in Electrical, Computing, Communication and Sustainable Technologies (ICAECT), 1–5, 2022.
10. Kishor Datta Gupta, **Hasmot Ali**, Marufa Kamal, Mohd Ariful Haque, Sayd Bahauddin Alam and Mohammad Rahman. 'Continuous Monitoring of Large-Scale Generative AI via Deterministic Knowledge Graph Structures'. Submitted on AAAI FSS 2025.

Voluntary Service

- **Reviewer**: ICMLA23, WVLL24, JMAI, and Heliyon.
- **Program Committee**: WVLL24 and ICMLA24.
- **Organizer**: 3 Programming Contests and Seminars for DIU Computer Programming Club.

Others Experience

- **Daffodil International University, Dhaka, Bangladesh** — Daffodil International University
  Undergraduate Teaching Assistant — *September 2020 - April 2021*
  - Mentored more than 25 students throughout their undergraduate thesis journey.
  - Assisted undergraduate thesis students to publish research papers at different International Conferences.
  - Created assignments, test materials, and evaluated coding assignments and test scripts.
- **DIU NLP & ML Research Lab, Dhaka, Bangladesh** — DIU-NLP & ML LAB
  Research Assistant — *October 2019 - September 2021*
  - Delivered Lectures as an instructor for two Machine Learning Bootcamps.
  - Supervised more than 50 students' research activities, including research projects.
  - Published 3 papers on International Conferences and 1 research paper in a peer-reviewed journal.
  - Collected field label data for the biggest Bangla Continuous Speech Dataset named Bayanno.

Awards

- Magna Cum Laude Academic Award (2021)
- DIU Outstanding Undergraduate Researcher Honorable Mention (2020)
- Secondary School Talent Pool Merit Scholarship (2015)