Md. Akmol Masud

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About Me

I am a machine-learning researcher with a strong background in processing and analyzing diverse data modalities to solve real-world challenges. My expertise spans computer vision, quantum machine learning, and semi-supervised learning, where I've developed innovative deep learning models and solutions in healthcare diagnostics and particle physics datasets. I love working with data and specialize in uncovering insights from complex datasets using advanced tools. I aim to advance methods that maximize learning from limited data, enabling transformative applications in fields where data scarcity is a critical barrier.

Research Interests

Semi-supervised Learning, Computer Vision, Quantum-Classical Neural Networks, Explainable AI, Graph Neural Networks, Statistical Analysis

Publications

[1] Md. Akmol Masud, Sanjida Akter, Nadia Sultana, Mohammad Shahidul Islam, Mohammad Abu Yousuf, Farzan Majeed Noori, and Md Zia Uddin. MosQNet-SA: Explainable convolutional-attention network for mosquito classification with application as a RESTful API for dengue and malaria risk mapping. 12 2024. [Preprint].

[2] Md Abrar Jahin, Md. Akmol Masud, M. F. Mridha, Zeyar Aung, and Nilanjan Dey. KACQ-DCNN: Uncertainty-Aware Interpretable Kolmogorov-Arnold Classical-Quantum Dual-Channel Neural Network for Heart Disease Detection, 2024. arXiv:2410.07446.

[3] Md. Akmol Masud, Sanjida Akter, Nadia Sultana, Md. Biplob Hosen, Mehrin Anannya, Mohammad Abu Yousuf, A K M Azad, Salem A Alyami, and Mohammad Ali Moni. Pseudo-RGB Data Augmentation for Improved Alzheimer's Disease Detection: An Analysis of CNN Performance. 12 2024. [Preprint].

[4] Md Abrar Jahin, Md. Akmol Masud, Md Wahiduzzaman Suva, M. F. Mridha, and Nilanjan Dey. Lorentz-Equivariant Quantum Graph Neural Network for High-Energy Physics, 2024. arXiv:2411.01641.

[5] Md Abrar Jahin, Md. Akmol Masud, M. F. Mridha, and Nilanjan Dey. Quantum Rationale-Aware Graph Contrastive Learning for Jet Discrimination, 2024. arXiv:2411.01642.

[6] Md. Akmol Masud, Sanjida Akter, Nadia Sultana, Mohammad Abu Yousuf, and Md Zia Uddin. Multi-Layered Password-Based Steganography: A Novel Approach for Tiered Information Hiding. 12 2024. [Preprint].

Datasets

[7] Md. Akmol Masud. Enhanced Alzheimer's Brain Scan Dataset: Normal and Synthesized, November 2024.

[8] Md. Akmol Masud. MosqVision-3K: A Balanced Multi-Source Dataset of 3,000 Annotated Images for Culex, Anopheles, and Aedes Mosquito Species Classification, November 2024.

Education

Institute of Information Technology, Jahangirnagar University — Dhaka, Bangladesh
B.Sc. in ICT; CGPA: 3.29/4.0 (8th semester: 3.6) — July 2024
Academic Transcript: View Full Transcript
Thesis: MosQNet-SA: An Explainable Convolutional Attention Network for Mosquito Classification with Potential Application as a RESTful API for Dengue and Malaria Risk Mapping

Sylhet Cadet College — Sylhet, Bangladesh
Higher Secondary Certificate (HSC); GPA: 5.0/5.0 — May 2018
Secondary School Certificate (SSC); GPA: 5.0/5.0 — May 2016

HSC Certificate: View HSC Certificate **SSC Certificate**: View SSC Certificate

Projects

- **MosQNet-SA** Implemented an advanced CNN-attention hybrid architecture for accurate mosquito species classification, contributing to disease surveillance systems.

- **Clickshots Python Package** Building a comprehensive Python package for automated screenshot capture and processing with advanced image manipulation capabilities.

- **Alzheimer's Image Augmentation using PseudoRGB**
Novel application of PseudoRGB augmentation techniques for enhanced Alzheimer's disease detection, demonstrating improved model performance.

- **Heart Disease Analysis and Prediction**
Conducted comprehensive statistical analysis and implemented machine learning models for heart disease prediction, achieving significant accuracy improvements through innovative feature engineering.

- **Sleep Apnea Detection Research**
Implementing novel deep learning architectures for sleep apnea detection through ECG signal analysis and spectrogram processing, focusing on automated diagnosis and monitoring.

GitHub Portfolio: Explore my projects on GitHub

Affiliation

IIT-JU Sports Club *Jan 2024 – Dec 2024*
President
- Led a 50-member organization, driving athletic programs and wellness initiatives to support student development.
- Successfully implemented new sports activities, increasing member participation by 30%.
- Foster team spirit and inclusivity through collaborative leadership and effective communication.

IEEE JU Student Branch *Feb 2022 – Aug 2024*
Media and Communications Lead & Membership Development Lead
- Spearheaded strategic communications and membership drives, boosting branch visibility and engagement by 40%.
- Organized and facilitated technical events and professional workshops, enhancing members' technical and career skills.
- Collaborated with industry professionals to deliver impactful knowledge-sharing sessions.

E-Business & Entrepreneurship Club, JU *Mar 2019 – Jun 2022*
Executive
- Designed and hosted entrepreneurship workshops and networking events connecting students with industry leaders.
- Mentored aspiring entrepreneurs, fostering innovative business ideas among peers.
- Played a pivotal role in building partnerships with external stakeholders to promote entrepreneurial initiatives.

Achievements

- 37th place in the CUET ETE Day 2023 ML Competition (NLP and DL) *12 Nov 2023 - 23 Nov 2023* Ranked 37th out of 200+ participants, showcasing problem-solving skills in NLP and deep learning under tight deadlines.
- 63rd place in the DL Enigma 1.0 - SUST CSE Carnival 2024 (Computer Vision) *20 Jan 2024 - 10 Feb 2024* Secured 63rd place in a competitive event, focusing on model tuning, optimization, and large-scale dataset processing for computer vision tasks.
- Duke of Edinburgh Leadership Award (Bronze Standard) *28 Feb 2027* Recognized for leadership, teamwork, and project management through the Duke of Edinburgh's Award program.

Technical Skills

- **Programming Languages:** Python (LeetCode), C++ (Codeforces), JavaScript, Java
- **ML/DL Frameworks:** TensorFlow, PyTorch, OpenCV, Scikit-Learn
- **Research Tools:** LaTeX, Git, Docker, Jupyter, Linux
- **Specialized Skills:** Quantum Computing, Signal Processing, Statistical Analysis
- **Development:** FastAPI, Django, RESTful APIs, Database Design

Extracurricular Activities

- 1st place, 110m hurdles, 47th Annual Athletics Competition, JU Certificate