Ibna Kowsar

kawser.ibn.93@gmail.com | ikowsar | kawseribn
https://kawseribn.github.io/ | Nashville, Tennessee

Education

Tennessee State University Tennessee
M.Sc. in Computer Science (Data Science Specialization) *2023 – 2025 (expected)*

- GPA: 4.0/4.0
- Thesis : **Improving Structured Data Imputation Using Attention Mechanisms: A Focus on Tabular and EHR Data**
  Supervisor: Manar D Samad, PhD.

Brac University Bangladesh
B.Sc. in Computer Science and Engineering *2017 – 2021*

- CGPA: 3.87/4.0 (Highest Distinction)
- Thesis : **Facial Expression Recognition: Convolutional Attentional Masking Network and Ensemble Approach**
  Supervisor: Md. Hasanul Kabir, PhD.

Research Interests: My research interests focus on Machine Learning, Computer Vision, and LLM, particularly in applications related to multi-modal learning and health informatics.

Professional Experience

Graduate Research Assistant Aug'2023 – Jun'2025
CIDA Lab, Tennessee State University

- Utilizing lightweight LLM for electronic health record (EHR) or structured tabular data
  - Unsupervised learning, Full-shot learning
- Implementing and enhancing deep learning algorithms for electronic health record (EHR) data [Allof Us workbench]
  - Unsupervised learning, Contrastive-learning, Attention-based methods
- Developing an unsupervised representation learning based probabilistic model to perform inter and intra-class domain adaptation
  - Contrastive-learning, KL-Divergence, Deep Clustering

Machine Learning Engineer Jul'2021 – Jan'2023
Apurba Technologies Ltd.

- **Optimized Bengali OCR Systems:** Improved detection and segmentation in character recognition models, enhancing text analysis accuracy and efficiency.
- **Developed ML Architectures:** Implemented scalable ML systems using Docker, streamlined data pipelines, and APIs (Flask, FastAPI), reducing inference times by 30%.

Lecturer Oct'2021 – Aug'2023
BRAC University

- Managed and mentored a diverse student body of over 150 each term while collaborating closely with fellow faculty to coordinate coursework
- Introduction to Robotics (CSE461), System Analysis and Design (CSE471), Digital Logic Design (CSE260), and Database Systems (CSE370)

Undergraduate Teaching Assistant Jan'20 – May'21
Programming Language I (Structured Programming) & II (OOP)

- Created video tutorial on Object Oriented Programming in both Java & Python
- Provided Consultation Hours for Problem Solving and Exam Preparation

Technical Skills

Languages and Frameworks: Python, Java, PyTorch, Tensorflow, MySQL, NoSQL, Assembly (x86, 8051), Flask, FastAPI
Developer Tools and Libraries: Git, OpenCV, Scipy, Matplotlib, Seaborn, Docker, AWS EC2, Jupyter, Asana, MongoDB, Bash Scripting, LATEX
Software and Design Environments: MATLAB, Simulink, Proteus, LabVIEW, Webots, Verilog, VHDL.

Current Projects

[1] Missing value imputation in structured data using attention-based methods (e.g., Tabular, EHR [MIMIC-III, IV, All of Us]).

[2] Deep cluster distribution alignment in source-target domain adaptation.

[3] Analysis of feature importance in EHR data using causal inference.

Research Experience and Publications

[1] **Kowsar, I.**, Rabbani, S. B., Hou, Y., & Samad, M. D. (2024)., *"DeepFSI: Deep Imputation of Missing Values Using Feature and Sample Attention"*.

[2] **Kowsar, I.**, Rabbani, S. B., Akhter, K. F. B., & Samad, M. D. (2024)., *"Deep Cluster Distribution Alignment in Source-Target Domain Adaptation"*.

[3] **Kowsar, I.**, Rabbani, S. B., & Samad, M. D. (2024)., *"Attention-based Imputation of Missing Values in Electronic Health Records Tabular Data"*, *In The 12th IEEE International Conference on Healthcare Informatics (ICHI)* DOI: 10.1109/ICHI61247.2024.00030.

[4] **Kowsar, I.**, Rabbani, S. B., Akhter, K. F. B., & Samad, M. D. (2024)., *"Contrastive Domain Adaptation by Minimizing Divergence in Source-Target Image Distributions"*, *International Conference on Imaging, Signal Processing and Communications (ICISPC)*

[5] **Kowsar, I.**, Rabbani, S. B., Akhter, K. F. B., & Samad, M. D. (2023)., *"Deep Clustering of Electronic Health Records Tabular Data for Clinical Interpretation"*, In 2023 IEEE International Conference on Telecommunications and Photonics (ICTP) (pp. 01-05). https://doi.org/10.1109/ICTP60248.2023.10490723

[6] Islam, M.M., **Kowsar, I.**, Zaman, M.S. et al. (2023)., *"A Novel Approach to Enhance Safety on Drowsy Driving in Self-Driving Car"*, Mobile Networks and Applications 28, 272–284. https://doi.org/10.1007/s11036-022-01932-8

[7] Das, A., Azad Rabby, A., **Kowsar, I.**, & Rahman, F. (2022)., *"A Deep Learning-based Unified Solution for Character Recognition"*, in 2022 26th International Conference on Pattern Recognition (ICPR), Montreal, QC, Canada, pp. 1671-1677. https://doi.org/10.1109/ICPR56361.2022.9956348

[8] Islam, M. M., Das, A., **Kowsar, I.**, Azad Rabby, A. K. M. Shahariar, Hasan, N., & Rahman, F. (2021)., *"Towards building a Bangla text recognition solution with a Multi-Headed CNN architecture"*, 2021 IEEE International Conference on Big Data (Big Data), Orlando, FL, USA, pp. 1061-1067. https://doi.org/10.1109/BigData52589.2021.9671653

[9] Alam, S. M. S., **Kowsar, I.**, Islam, M. A. -J., Zaman, S. S., Kabir, T. T., & Bin Ashraf, F. (2021)., *"An efficient Metaheuristic Approach for Finding Motifs from DNA Sequences"*, 2021 IEEE International Conference on Big Data (Big Data), Orlando, FL, USA, pp. 1061-1067. 10.1109/EICT54103.2021.9733453

Projects

- **Facial Expression Recognition** | *Deep Learning, Attention Model*
- **Driver Drowsiness Detection and Alarming System** | *Opencv, Machine Learning*
- **Simobot: Simulation for Evolutionary Robotics** | *AI, Robotics, Simulation*

Certificates & Awards

- Highest Distinction, Brac University 2021
- Merit Scholarship Award, Brac University 2019-2021
- VC's List and Dean's List Award, Brac University 2019-2022
- Presentation Skill Award, Brac University 2017