Redwan Ahmed Rizvee

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RESEARCH INTERESTS

My research focuses on **Visual Analytics** and **Database Theory**. I am specifically interested in how **sampling algorithms** can maintain the statistical integrity of big data visualizations, ensuring that outliers and dense regions remain perceptible to users during exploratory analysis.

Education

University of Massachusetts Amherst Amherst, MA
PhD in Computer Science (Advisor: Dr. Alexandra Meliou) *Sep. 2025 – Present*
- **Research Focus:** Developing perception-aware sampling algorithms to optimize visual fidelity in large-scale scatter plots.
- Addressing challenges in **representational accuracy** and **computational efficiency** for big data visualization.

University of Dhaka Dhaka, Bangladesh
Master of Science in Computer Science and Engineering *Jan. 2019 – Sep. 2021*
- CGPA: **4.00/4.00** (Ranked 1^{st} in class)

University of Dhaka Dhaka, Bangladesh
Bachelor of Science in Computer Science and Engineering *Jan. 2015 – Dec. 2018*
- CGPA: **3.85/4.00** (Ranked 1^{st} in class) | *Dean's Award, Gold Medalist*

Technical Skills

Languages: Python, C++, C, Java, SQL, JavaScript (ES6+), Shell Scripting
Machine Learning: PyTorch, TensorFlow, Keras, Scikit-learn, Pandas, NumPy, SciPy
Web & Frameworks: Django, Flask, React, Node.js, HTML5/CSS3, Bootstrap
Tools & Platforms: Git, Docker, Linux/Unix, MySQL, PostgreSQL, Firebase, LaTeX

Experience

University of Massachusetts Amherst (DREAM Lab) Amherst, MA
Graduate Research Assistant *Sep. 2025 – Present*
- Designing statistical sampling methods to preserve **outliers** and local density in massive datasets, ensuring high data coverage during visual exploration.
- Optimizing big data pipelines for real-time visual analytics, focusing on the intersection of Database Theory and Visual Perception.

Cognitive Agents and Interaction Lab (CAIL) Dhaka, Bangladesh
Co-Investigator *Jan. 2023 – Aug. 2025*
- Supervised projects utilizing Deep Learning and Reinforcement Learning for agent-based decision making.
- Architected **COLAS** (Coding Lab Assistant), an automated source code evaluation system that integrates plagiarism detection and strict monitoring for academic labs.

TigerIT Bangladesh Limited Dhaka, Bangladesh
Research Scientist *July 2020 – Feb. 2022*
- Led R&D on statistical sensor data analysis and deployed rule-based algorithms for production environments.
- Designed and implemented **Encoder-Decoder architectures with Attention** mechanisms for audio processing and Natural Language Processing (NLP) tasks.
- Optimized deep learning pipelines, resulting in improved inference speed and model accuracy for different applications.

Data Mining Research Lab Dhaka, Bangladesh
Research Assistant *Jan. 2018 – Jul 2025*
- Developed novel pattern mining algorithms focusing on scalability and resource efficiency for time-series data.
- Formulated metrics for robust correlation analysis and cluster generation in high-dimensional datasets.

Data and Design Lab (DnD Lab) Dhaka, Bangladesh
Research Assistant *Apr. 2019 – Sep. 2019*
- Worked in the BDQOL project, which focuses on developing a composite indicator to measure the quality of life index for low-resource countries. I contributed to the research, data collection, data processing, and visual dashboard implementation. The BDQOL project has been a joint initiative with BRAC, one of the largest NGOs in the world.

Selected Projects

COLAS - Coding Lab Assistant | *Python, React, Django, LLM* [COLAS]

- Built a scalable, full-stack automated evaluation system for live programming labs.
- Integrated plagiarism detection and real-time monitoring, improving grading efficiency for large student cohorts.

Bangladesh Quality of Life Indicator (BDQOL) | *JavaScript, Data Viz* [BDQOL]

- Developed an interactive visualization tool to track socio-economic conditions based on SDG indicators.
- Handled data pipeline engineering to process complex socio-economic datasets for web rendering.

MSCLM-A | *Python, NLP*

- Created a memory-flexible, language-independent sentence completion module using Arpa-based Language Models.

Selected Publications

(Full list of 15+ publications available on Google Scholar)

R. A. Rizvee, C. F. Ahmed, M. F. Arefin, C. K. Leung, "A new tree-based approach to mine sequential patterns", *Expert Systems with Applications*, vol. 242, 122754, 2024. [DOI]

R. A. Rizvee, R. Hassan, M. M. Khan, "Reinforcement Learning-Based Formulations With Hamiltonian-Inspired Loss Functions for Combinatorial Optimization", *IEEE Access*, 2024.

R. A. Rizvee, et al., "LeafNet: A proficient convolutional neural network for detecting seven prominent mango leaf diseases", *Journal of Agriculture and Food Research*, 2023.

Posters & Presentations

New England Database Day (NEDB), 2026 | *Poster Presenter* Jan. 2026

- Selected to present research on perception-aware sampling techniques for large-scale data to the regional database community.

Honors & Awards

Research Excellence Recognition (2025): University of Dhaka, for exemplary scholarly contribution.

Dean's Award & Gold Medal (2019): For achieving the highest distinction in the Faculty of Engineering.

Fellowship Scholarship: ICT Division, Bangladesh, for high-impact research.