Muhammad Sohel Rana

LinkedIn | GitHub | Google Scholar | `muhammadsohel.rana@mavs.uta.edu` | (682)-376-4133

Objective

Apply my expertise in machine learning, data science and scalable optimal transport to develop innovative and scalable solutions in an industrial focused research role.

Education

Ph.D. candidate, Mathematics and Data Science, The University of Texas at Arlington, USA Expected: 2026
Research : Manifold learning, optimal transport, scalable optimal transport, dimensionality reduction.

Experience

Graduate Research Assistant, UT Arlington, USA June 2023 – Present
- Improved manifold learning techniques implemented for supervised and unsupervised machine learning.
- worked in a capstone project as a group leader of undergraduate students of the division of data science of UT Arlington.

Graduate Teaching Assistant, UT Arlington, USA September 2019-May 2021, September 2022 - May 2023
- Mentoring student in the interactive problem solving session, provided guidance during weekly projects, handling grading on technology (canvass, blackboard)

Lecturer
Department of Mathematics and Physics, North South University, Bangladesh
January 2022 - August 2022
- Taught calculus I, II, algebra courses to 400+ students

Graduate Teaching Assistant, Western Kentuck University, USA August 2015 - December 2015
Senior Officer, Pubali Bank Limited,Bangladesh June 2012- July 2015

Technical skills

Languages: Python, LaTex, Mathematica, C, Fortran
Tools: Numpy, Pandas, scikit-learn, keras, Pytorch, Tensorflow, NLTK, Matplotlib, PostgreSQL
Expertise: Computer vision, NLP, Manifold learning techniques, supervised and unsupervised machine learning

Notable projects

Optimal transport based dimensionality reduction
Applied optimal transport to investigate whether modeling data set (images, text) as probability measure results to an improved supervised and unsupervised performance. *Publications:* TMLR 2025 (Submitted)

Empowering Clients: Self-Adaptive Federated Learning for Data Quality Challenges
Developed a scalable method to improve the efficiency of federated learning, empowering self- decides to participate in training to reduce communication cost by 30% and computation cost by 55%, optimized performance of the global model. *Publications:* IEEE EDGE 2025 (Submitted)

Publications

- **Muhammad Rana**, Phuong Trinh, Ryan Bui, Keaton Hamm. "Optimal transport based dimensionality reduction." *Transactions on Machine Learning Research, 2025* (Submitted)
- Zahidur Talukder, **Muhammad Rana**, Keaton Hamm, Mohammad A. Islam. "Empowering Clients: Self-Adaptive Federated Learning for Data Quality Challenges." *IEEE International Conference on Edge Computing and Communications, 2025* (Submitted)

Recognition

- **Math Academic Excellence Scholarship**, Mathematics Department, The University of Texas at Arlington, 2025.
- **Glenn and Virginia Powers Memorial Scholarship**, Mathematics Department, Western Kentucky University, 2016.
- **Honors Results Based Merit Scholarship**, Fazlul Huq Muslim Hall, Dhaka University, 2010.