ZAHIDUR TALUKDER

Scholar | github | website | 682-266-9164 | zahidurrahim.talukder@mavs.uta.edu | Linkedin

OBJECTIVE

My research is primarily focused on the theoretical, empirical, and security aspects of machine learning algorithms, data science, and distributed computing. I have been working on secured, fair and efficient data and client handling in federated learning, with a strong passion for applications related to privacy-preserving machine learning, data privacy & security and distributed learning.

EDUCATION

PhD Candidate, Computer Science, The University of Texas at Arlington, GPA: 4.00/4.00   Sep 2019 - Aug 2024
Research Interests: Machine Learning Algorithms, Cybersecurity & Data Privacy, Distributed System, IoT and Edge Computing

EXPERIENCE

Graduate Research Assistant   *Sep 2019 - Present*
Rigourous Design Lab, The University of Texas at Arlington
- Designed an efficient aggregation algorithm, enabling client-driven participation decisions and ensuring fairness among clients with diverse model architectures in federated learning across healthcare, finance, autonomous vehicles, and other sectors.

Graduate Teaching Assistant   *Sep 2019 - Present*
The University of Texas at Arlington
- Instructed graduate and undergraduate courses in algorithms & data structures, computer architecture, and more.

TECHNICAL SKILLS

- **Languages:** Python, Matlab, C, LaTex
- **Tools:** Tensorflow, Pytorch, Keras, MySQL, Scikit-Learn, Pandas, Numpy, Linux, Git, CUDA, FFT, DOCKER, Matplotlib
- **Expertise:** Machine Learning, Federated Learning, Data Science, Deep Learning, CNN, RNN, NLP, Computer Vision, DSP

FEATURED PROJECTS

FairHeteroFL: Hardware-Sensitive Fairness in Federated Learning with Heterogeneous Environment   *Aug 2022 - Present*
Developed "FairHeteroFL" with theoretical analysis, a hardware-sensitive Federated Learning (FL) method, to enhance fairness among heterogeneous federated clients, reduce variance in test loss across devices, and improve overall FL performance validated using LR, CNN, RNN, and NLP models.

FedSRC: Computation and Communication Efficient Federated Learning with Self-Regulating Clients   *Jan 2022 - Present*
Developed "FedSRC" with theoretical analysis, utilizing Python, TensorFlow, and Keras to enhance Federated Learning (FL) efficiency by enabling autonomous client participation decisions, reducing communication costs (up to 30%) and computation costs (55%), and optimizing global model performance. *Publications:* SIGMETRICS 2022

FedASL: Auto-Weighted Aggregation for Heterogeneous Federated Learning   *Jan 2021 - May 2022*
Introduced "FedASL", a novel Federated Learning (FL) approach that employs local training loss for auto-weighted model aggregation, effectively addressing data heterogeneity issues in FL and reducing computation costs by up to one-tenth compared to existing methods validated by Mnist, Femnist, CIFAR10 and Shakespeare datasets. *Publications:* IEEE EDGE 2022

Server-Level Power Monitoring in Data Centers Using Single-Point Voltage Measurement   *Sep 2019 - Present*
Developed a low-cost, novel power monitoring approach in real-time streaming data, utilizing a single sensor to extract power consumption information from all servers, leveraging conducted electromagnetic interference. *Publications:* SENSYS 2022

SELECTED PUBLICATIONS

- "FairHeteroFL: Hardware-Sensitive Fairness in Federated Learning with Heterogeneous Environment"
  Zahidur Talukder, Bingqian Lu, Shaolei Ren Mohammad A. Islam (In-Submission)
- "Computationally Efficient Auto-Weighted Aggregation for Heterogeneous Federated Learning"
  Zahidur Talukder, Mohammad A. Islam (IEEE EDGE 2022) (code)
- "FedSRC: Computation and Communication Efficient Federated Learning with Self-Regulating Clients"
  Zahidur Talukder, Mohammad A. Islam (SIGMETRICS 2022)
- "Towards Server-Level Power Monitoring in Data Centers Using Single-Point Voltage Measurement"
  Pranjol Gupta, **Zahidur Talukder**, Mohammad A. Islam (SENSYS 2022)

RECOGNITION

- **Best Poster Award Honorable Mention** - SCRF@UTA 2022, SCRF@UTA 2023
- **Secondary and Higher Secondary Board Merit Scholarship** - Bangladesh Education Board (top 0.1%)

VOLUNTEERING EXPERIENCE

- I-Engage Graduate Summer Mentor 2023
- Student volunteer at SC22, Dallas, Tx, USA
- UTA LSAMP - Summer Research Academy mentor in 2022
- Culture Secretary of Bangladesh Student Organization (BSO) in 2021
- Reviewer for The 4th Workshop on Online Abuse and Harms (WOAH) in 2020