

MD KAMRAN CHOWDHURY SHISHER

341 War Eagle Way, Auburn, AL, 36830

✉ mzs0153@auburn.edu 🏠 <https://kamran0153.github.io> ☎ 334-332-3690

Education

Ph.D. in Electrical Engineering

Auburn University, Auburn, AL; Advisor: Yin Sun

Aug. 2018 – Present

CGPA: 4.00/4.00

M.S. in Electrical Engineering

Auburn University, Auburn, AL; Advisor: Yin Sun

Aug. 2018 – Aug. 2022

CGPA: 4.00/4.00

B.Sc. in Electrical and Electronics Engineering

Bangladesh University of Engineering and Technology

Feb. 2013- Sep. 2017

CGPA: 3.80/4.00

Research Interests

Communication Networks

Semantic Communications

Information Freshness

Information Theory

Reinforcement Learning

Optimization and Decision Theory

Work Experience

Research Assistant, Real-time Networking Lab, Auburn University

Fall 2018-present

- **Project 1: Impact of Fresh Features on Machine Learning**

We conducted five supervised learning-based experiments to understand the impact of fresh features. The experiments include: **robot state prediction, video prediction, channel state information prediction, temperature prediction, and solar power prediction**. The experimental results show that (i) for Markov data sequence, the fresh feature is always better and (ii) for non-Markov data sequence, a fresh feature may not be better. For both Markov and non-Markov sequences, we developed an information-theoretic tool to interpret and analyze the impact of fresh features.

- **Project 2: Scheduler for Single Source-Predictor Pair Remote Inference System**

Based on insights from Project 1, we designed new **feature selection strategies** and selection-from-buffer **scheduling algorithms** for improving the performance of a remote inference system.

- **Project 3: Scheduler for Multiple Source-Predictor Pairs Remote Inference System**

Scheduling and feature selection problem for multiple source-predictor pairs is a **restless multi-armed bandit** problem with multiple actions. In this case, we designed new asymptotically optimal algorithms.

Teaching Assistant, ELEC-5970: Applied Statistical and Machine Learning, Auburn University Spring 2023

- Delivered in-class coding lectures on K-nearest neighbors algorithm, SVM, decision tree, XGBoost, neural network, image classification with transfer learning, text classification with LSTM.

Teaching Assistant, ELEC-7970: Reinforcement Learning, Auburn University Spring 2020-2022, Fall 2022

- Delivered in-class coding lectures on value iteration, policy iteration, temporal difference, SARSA, Q-learning, DQN, and REINFORCE algorithms.

Preprints and under review:

1. **Md Kamran Chowdhury Shisher** and Yin Sun, “On the Monotonicity of Information Aging,” under review in *IEEE INFOCOM ASoI Workshop*, 2023.
2. **Md Kamran Chowdhury Shisher**, Yin Sun, and I-Hong Hou, “Timely Communications for Remote Inference,” under review in *IEEE/ACM Transactions on Networking*, 2023.
3. Cagri Ari, **Md Kamran Chowdhury Shisher**, Elif Uysal, and Yin Sun, “Goal-Oriented Communications for Remote Inference with Two-Way Delay,” 2023.
Technical report: <https://webhome.auburn.edu/~yzs0078/CagriICC2024.pdf>

Peer-reviewed Journal Papers:

4. **Md Kamran Chowdhury Shisher**, Bo Ji, I-Hong Hou, and Yin Sun, “Learning and Communications Co-Design for Remote Inference Systems: Feature Length Selection and Transmission Scheduling,” *IEEE Journal on Selected Areas in Information Theory*, vol. 4, pp. 524-538, 2023.
5. Kevin Yan, **Md Kamran Chowdhury Shisher**, and Yin Sun, “A Transfer Learning-Based Deep Convolutional Neural Network for Detection of Fusarium Wilt in Banana Crops,” *AgriEngineering*, vol. 5, no. 4, pp. 2381-2394, 2023.

Peer-reviewed Conference Papers:

6. Tasmeen Zaman Ornee, **Md Kamran Chowdhury Shisher**, Clement Kam, and Yin Sun, “Context-aware Status Updating: Wireless Scheduling for Maximizing Situational Awareness in Safety-critical Systems,” *IEEE MILCOM QuAVoI Workshop*, 2023.
7. **Md Kamran Chowdhury Shisher** and Yin Sun, “How Does Data Freshness Affect Real-time Supervised Learning?” *ACM MobiHoc*, 2022. [Acceptance Rate: 19.8%]
8. **Md Kamran Chowdhury Shisher**, Heyang Qin, Lei Yang, Feng Yan, and Yin Sun, “The Age of Correlated Features in Supervised Learning based Forecasting,” *IEEE INFOCOM AoI Workshop*, 2021.
9. **Md. Kamran Chowdhury Shisher**, Tasmeen Zaman Ornee, and Md. Farhad Hossain, “QoS aware user association in massive MIMO enabled hetnets for DTU and NDTU traffic,” *IEEE ICAEE*, 2017.

Talks

Learning and Communications Co-design For Remote Inference: Feature Length Selection and Transmission Scheduling

- Invited Talk at University of Maryland, College Park, MD Oct 2023
- Graduate Engineering Research Showcase, Auburn University Oct 2023

Communications of Timely Information for Real-time Machine Learning and Networked Intelligence

North American School of Information Theory, Philadelphia, PA June 2023

How Does Data Freshness Affect Real-time Supervised Learning?

- Information Theory Application Workshop, San Diego, CA Feb 2023
- Auburn University Research Symposium March 2023
- ACM MobiHoc, Seoul, South Korea. Oct 2022
- College of Engineering Research Showcase at the U.S. Space and Rocket Center, Huntsville, AL Aug 2022

The Age of Correlated Features in Supervised Learning based Forecasting

IEEE INFOCOM AoI Workshop, Vancouver, BC, Canada (virtual)

May, 2021

Student Mentoring

Cagri Ari, Middle East Technical University Graduate Student

- Designed scheduling strategies for goal-oriented communications for remote inference systems with two-way delay.
- A paper is submitted at IEEE ICC, 2024.
Technical report: <https://webhome.auburn.edu/~yzs0078/CagriICC2024.pdf>

Mengxue Li, Tuskegee University Graduate Student

- Currently working on a food pantry visit forecasting project.
- Project webpage: <https://github.com/Kamran0153/Food-Pantry-Household-Visit-Forecasting>

Justin Tran, Auburn University Undergraduate Student

- Worked on optimal pilot scheduling for throughput maximization.
- Project webpage: http://webhome.auburn.edu/~yzs0078/project_Justin/project_Justin.html

Kevin Yan, Auburn High School Student

- Worked on transfer learning-based Deep Convolutional Neural Network for Detection of Fusarium Wilt in Banana Crops.
- A paper from this project is published in *AgriEngineering*.

Awards and Honors

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| Candidate Profile , ACM SIGMETRICS Performance Evaluation Review published in a special issue on job market candidates. | Dec 2023 |
| NSF Student Travel Grant , ACM MobiHoc to attend ACM MobiHoc 2023 in Washington, D.C. | Oct 2023 |
| NSF Travel Grant , North American School of Information Theory to attend and present poster at NASIT 2023 in Philadelphia, PA. | June 2023 |
| ACM SIGMOBILE Student Travel Grant , ACM MobiHoc to attend and present paper at ACM MobiHoc 2023 in Seoul, Korea. | Oct 2022 |
| IEEE INFOCOM Student Conference Grant to attend IEEE INFOCOM virtually. | June 2022 |
| NSF Student Conference Award , IEEE INFOCOM to attend and present paper at IEEE INFOCOM 2021 virtually. | June 2022 |
| Dean's Award , BUET, Bangladesh for outstanding academic performance in those years. | 2017, 2016, 2015 |
| Best Cadet , Rangpur Cadet College for outstanding academic performance during 2006-2012 | 2012 |
| SSC Scholarship (Talent) , Government of Bangladesh for outstanding results in SSC examination | 2010 |
| Primary Scholarship (Talent) , Government of Bangladesh for outstanding results in Primary Scholarship examination | 2005 |

Services

TPC member

- IEEE WCNC, 2021
- IEEE WCNC, 2022

Reviewer for Journal Manuscript Submissions

- IEEE Journal of Communications and Networks, 2023

- IEEE Journal on Selected Areas in Information Theory, 2023
- IEEE Open Journal of the Communications Society, 2023
- IEEE Transactions on Wireless Communications, 2022
- IEEE Journal on Selected Areas in Communication, 2020
- IEEE Journal of Communications and Networks, 2020

Reviewer for Conference Manuscript Submissions

- IEEE ISIT, 2022
- IEEE WCNC, 2022
- IEEE INFOCOM, 2022
- IEEE WCNC, 2021
- IEEE INFOCOM, 2020
- IEEE INFOCOM AoI Workshop, 2020
- IEEE INFOCOM AoI Workshop, 2019

Maintainer of an **online paper repository on Age of Information**

Aug 2018-Aug 2021

Volunteer on E-Day, Auburn University, Auburn, AL

Feb 2020

Organizing Secretary, Bangladesh Student Organization, Auburn University

2022-2023

House Cultural Prefect, Rangpur Cadet College, Bangladesh

2011-2012

Junior Prefect, Rangpur Cadet College, Bangladesh

2011

Professional Membership

IEEE Member

IEEE Information Theory Society Member

IEEE Communication Society Member

ACM SIGMOBILE Member

References

Prof. Yin Sun, yzs0078@auburn.edu, Auburn University

Prof. I-Hong Hou, ihou@tamu.edu, Texas A&M University

Prof. Shiwen Mao, smao@auburn.edu, Auburn University

Prof. Elif Uysal, uelif@metu.edu.tr, Middle East Technical University