Md Kamran Chowdhury Shisher

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Education

Ph.D. in Electrical Engineering **Aug. 2018 – Present**
Auburn University, Auburn, AL; Advisor: Yin Sun *CGPA: 4.00/4.00*

M.S. in Electrical Engineering **Aug. 2018 – Aug. 2022**
Auburn University, Auburn, AL; Advisor: Yin Sun *CGPA: 4.00/4.00*

B.Sc. in Electrical and Electronics Engineering **Feb. 2013- Sep. 2017**
Bangladesh University of Engineering and Technology *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

- Developed a novel information-theoretic tool to interpret the importance of information freshness on the performance of real-time applications, such as remote inference and remote estimation [P1, P3, P4, P8].
- Proposed a new information updating model called "selection-from-buffer" model [P1, P3, P8]. When there is a single source-predictor pair and a single channel in a remote inference system, we designed optimal scheduling policies [P3, P8]. When there are multiple source-predictor pairs and multiple channels, the scheduling problem is a multi-action restless multi-armed bandit problem. For this setting, we designed a new asymptotically optimal policy [P3, P8].
- A longer feature can provide better learning performance, but it often requires more communication resources. Jointly optimized length of feature sequences and transmission scheduling for remote inference systems [P1].

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.

PUBLICATIONS

(P1) **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*, 2023.

(P2) 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.

(P3) **Md Kamran Chowdhury Shisher** and Yin Sun, "How Does Data Freshness Affect Real-time Supervised Learning?" *ACM MobiHoc*, 2022. [**Acceptance Rate: 19.8%**]

(P4) **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.

(P5) **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.

Under Review

(P6) Cagri Ari, **Md Kamran Chowdhury Shisher**, Elif Uysal, and Yin Sun, "Goal-Oriented Communications for Remote Inference with Two-Way Delay", submitted to *IEEE ICC, 2024*.
Technical report: https://webhome.auburn.edu/~yzs0078/CagriICC2024.pdf

(P7) 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", submitted to *AgriEngineering*, 2023. Available: https://www.preprints.org/manuscript/202309.1681/v1

In Progress

(P8) **Md Kamran Chowdhury Shisher**, I-Hong Hou, and Yin Sun, "Timely Communications for Remote Inference," *in preparation*, 2023.

(P9) Tasmeen Zaman Ornee, **Md Kamran Chowdhury Shisher**, Clement Kam, and Yin Sun, "Timely Updates for Situational Awareness", in preparation, 2023.

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 [P6].
  Technical report: https://webhome.auburn.edu/~yzs0078/CagriICC2024.pdf

Mengxue Li, Tuskegee 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

- 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 under review in *AgriEngineering* [P7].
  Preprints: https://www.preprints.org/manuscript/202309.1681/v1

Awards and Honors

Candidate Profile, ACM SIGMETRICS Performance Evaluation Review — Dec 2023
accepted for a special issue on job market candidates.

NSF Student Travel Grant, ACM MobiHoc — Oct 2023
to attend ACM MobiHoc 2023 in Washington, D.C.

NSF Travel Grant, North American School of Information Theory — June 2023
to attend and present poster at NASIT 2023 in Philadelphia, PA.

ACM SIGMOBILE Student Travel Grant, ACM MobiHoc — Oct 2022
to attend and present paper at ACM MobiHoc 2023 in Seoul, Korea.

IEEE INFOCOM Student Conference Grant — June 2022
to attend IEEE INFOCOM virtually.

NSF Student Conference Award, IEEE INFOCOM — June 2022
to attend and present paper at IEEE INFOCOM 2021 virtually.

Dean's Award, BUET, Bangladesh — 2017, 2016, 2015
for outstanding academic performance in those years.

Best Cadet, Rangpur Cadet College — 2012
for outstanding academic performance during 2006-2012

SSC Scholarship (Talent), Government of Bangladesh — 2010
for outstanding results in SSC examination

Primary Scholarship (Talent), Government of Bangladesh — 2005
for outstanding results in Primary Scholarship examination

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. Shiewen Mao, smao@auburn.edu, Auburn University
Prof. Roy Yates, ryates@winlab.rutgers.edu, Rutgers University
Prof. Bo Ji, boji@vt.edu, Virginia Tech
Prof. I-Hong Hou, ihou@tamu.edu, Texas A&M University