MERT KAYAALP

Adaptive Systems Lab, EPFL, Lausanne, Switzerland — mert.kayaalp@epfl.ch — Personal Website

RESEARCH INTERESTS

Machine learning, multi-agent decision-making, social networks, systems and control, causal inference, signal processing, time-series forecasting, inference over graphs

EDUCATION

Ph.D., École Polytechnique Fédérale de Lausanne (EPFL)   Sep 2019 - Aug 2024
Computer and Communication Sciences   Lausanne, Switzerland
Thesis: Sequential Reasoning with Socially Caused Beliefs   Advisor: Prof. Ali H. Sayed

B.S., Koç University   Sep 2015 - Jun 2019
Electrical and Electronics Engineering, Summa Cum Laude   Istanbul, Turkey

PUBLICATIONS

PRE-PRINTS

1. M. Kayaalp, Y. Inan, V. Koivunen, and A. H. Sayed, "Causal influence in federated edge inference," *under review*, arXiv:2405.01260
2. P. Hu, V. Bordignon, M. Kayaalp, and A. H. Sayed, "Non-asymptotic performance of social machine learning under limited data", *under review*, arXiv:2306.09397
3. M. Kayaalp and A. H. Sayed, "Causal influences over social learning networks", *under review*, arXiv:2307.09575

JOURNAL

1. V. Shumovskaia, M. Kayaalp, and A. H. Sayed, "Detection of malicious agents in social learning", *IEEE Signal Processing Letters*, vol. 31, pp. 1745-1749, July 2024
2. V. Shumovskaia, M. Kayaalp, and A. H. Sayed, "Social learning in community structured graphs," *IEEE Transactions on Signal Processing*, vol. 72, pp. 2812-2826, May 2024
3. M. Kayaalp, Y. Inan, E. Telatar, and A. H. Sayed, "On the arithmetic and geometric fusion of beliefs for distributed inference," *IEEE Transactions on Automatic Control*, vol. 69, no. 4, pp. 2265-2280, April 2024
4. M. Kayaalp, V. Bordignon, and A. H. Sayed, "Social opinion formation and decision making under communication trends", *IEEE Transactions on Signal Processing*, vol. 72, pp. 506-520, January 2024
5. M. Kayaalp, F. Ghadieh, and A. H. Sayed, "Policy evaluation in decentralized POMDPs with belief sharing," *IEEE Open Journal of Control Systems*, vol. 2, pp. 125-145, June 2023
6. V. Shumovskaia, M. Kayaalp, M. Cemri, and A. H. Sayed, "Discovering influencers in opinion formation over social graphs," *IEEE Open Journal of Signal Processing*, vol. 4, pp. 188-207, March 2023
7. M. Kayaalp, S. Vlaski, and A. H. Sayed, "Dif-MAML: Decentralized multi-agent meta-learning," *IEEE Open Journal of Signal Processing*, vol. 3, pp. 71-93, January 2022

CONFERENCE

1. M. Kayaalp, Y. Inan, V. Koivunen, and A. H. Sayed, "Causal impact analysis for asynchronous decision making," *IEEE ISIT*, Athens, Greece, 2024
2. V. Shumovskaia, M. Kayaalp, and A. H. Sayed, "Distributed decision-making for community structured networks," *IEEE ICASSP*, Seoul, Korea, April 2024
3. V. Bordignon, M. Kayaalp, V. Matta, and A. H. Sayed, "Social learning with non-Bayesian local updates," *EUSIPCO*, Helsinki, Finland, September 2023
4. M. Kayaalp, Y. Inan, V. Koivunen, E. Telatar, and A. H. Sayed, "On the fusion strategies for federated decision making," *IEEE Statistical Signal Processing Workshop (SSP)*, Hanoi, Vietnam, July 2023, **(award winning article)**.
5. V. Shumovskaia, M. Kayaalp, and A. H. Sayed, "Identifying opinion influencers over social networks," *IEEE ICASSP*, Rhodes Island, Greece, June 2023
6. P. Hu, V. Bordignon, M. Kayaalp, and A. H. Sayed, "Performance of social machine learning under limited data," *IEEE ICASSP*, Rhodes Island, Greece, June 2023
7. M. Cemri, V. Bordignon, M. Kayaalp, V. Shumovskaia, and A. H. Sayed, "Asynchronous social learning," *IEEE ICASSP*, Rhodes Island, Greece, June 2023
8. Y. Inan, M. Kayaalp, E. Telatar, and A. H. Sayed, "Social learning under randomized collaborations," *IEEE ISIT*, Helsinki, Finland, June 2022
9. M. Kayaalp, V. Bordignon, S. Vlaski, and A. H. Sayed, "Hidden Markov modeling over graphs," *IEEE Data Science and Learning Workshop (DSLW)*, Singapore, May 2022
10. Y. Inan, M. Kayaalp, A. H. Sayed, and E. Telatar, "A fundamental limit of distributed hypothesis testing under memoryless quantization," *IEEE ICC*, Seoul, South Korea, May 2022
11. M. Kayaalp, S. Vlaski, and A. H. Sayed, "Distributed meta-learning with networked agents," *EUSIPCO*, Dublin, Ireland, August 2021

THESIS

1. M. Kayaalp, "Sequential Reasoning with Socially Caused Beliefs", *École Polytechnique Fédérale de Lausanne*

EXPERIENCE

Applied Scientist Intern, Amazon Web Services
Research internship in Machine Learning and Time Series Forecasting Team
<div align="right">Sep 2024 - Jan 2025
Berlin, Germany</div>

Research and Teaching Assistant, Adaptive Systems Laboratory, EPFL
Thesis: Sequential Reasoning with Socially Caused Beliefs
<div align="right">Sep 2019 - Aug 2024
Lausanne, Switzerland</div>

Research Internship, Tandon School of Engineering, New York University
Research assistant in the Communication and Information Theory (CommIT) Group
<div align="right">Jun 2018 - Sep 2018
New York, US</div>

Software Engineer Intern, Comodo Cybersecurity
Contribution to database migration project with Java and MongoDB
<div align="right">Jun 2017 - Jul 2017
Ankara, Turkey</div>

HONORS AND AWARDS

Best Student Paper Award – IEEE Statistical Signal Processing Workshop	Hanoi, Vietnam, Jul 2023
Rising Stars in Signal Processing - IEEE ICASSP	Rhodes, Greece, Jun 2023
EPFL EDIC Fellowship - For the first year of PhD studies	Sep 2019 - Sep 2020
Vehbi Koç Honor Awardee - Awarded to students achieving the highest GPAs	Feb 2016 - Jun 2019
Semahat Arsel Scholar - Full tuition scholarship with stipend for top performers in LYS	Sep 2015 - Jun 2019
Bronze Medal - International Physics Olympiad (IPhO)	Mumbai, India, Jul 2015
Silver Medal - National Physics Olympiad (Turkish National Science Foundation)	Dec 2014, Dec 2013
Turkish National University Entrance Examination (LYS)	Jun 2015

1st out of 1.8 million participants

TEACHING

Teaching assistant

Information, Computation and Communication (BS)	Fall 2021, 2023
Adaptation and Learning (MS)	Spring 2022
Advanced Machine Learning (MS)	Spring 2021
Large-Scale Data Science for Real-World Data (MS)	Spring 2020
Analysis I (BS)	Fall 2020

Mentorship

Adrian Karol Fluder, BS, EPFL	Summer 2024
Bianca Pitu, BS, EPFL	Summer 2024
Luca Pana, BS, EPFL	Spring 2024
Stefan Taga, BS, EPFL	Spring 2024
Eduardo Faria Cabrera, BS, University of Sao Paulo, Brazil	Fall 2023
Elyas Benyamina, MS, Université Pierre et Marie Curie (UPMC), France	Summer 2023
Mert Cemri, BS, Bilkent University, Turkey	Summer 2022
Ching-Fang Li, MS, National Taiwan University, Taiwan	Summer 2022
Fatima Ghadieh, BS, American University of Beirut, Lebanon	Summer 2022

SELECTED TALKS AND CONFERENCES

1. "Decision Making in an Interconnected and Modular World", *Poster presentation at Princeton Workshop on Optimization, Learning, and Control*, Princeton, June 2024
2. "Mathematical Models of Social Opinion Formation", *Invited talk at EPFL-Polympiads*, Lausanne, April 2024
3. "Collaborative Decision Making over Ad-hoc Networks", *Invited talk at Ford Otosan Automotive Technologies Laboratory*, Online, December 2023
4. "On the Fusion Strategies for Federated Decision Making", *Poster presentation at IEEE SSP*, Hanoi, July 2023
5. "Interpretable and Socially Intelligent Systems", *Poster presentation at Rising Stars in Signal Processing Workshop, IEEE ICASSP*, Rhodes, June 2023
6. "Asynchronous Social Learning", *Poster presentation at IEEE ICASSP*, Rhodes, June 2023
7. "Social Learning under Randomized Collaborations", *Oral presentation at IEEE ISIT*, Helsinki, July 2022
8. "Hidden Markov Modeling over Graphs", *Oral presentation at IEEE DSLW*, Online, May 2022
9. "Distributed Meta-Learning with Networked Agents", *Oral presentation at EUSIPCO*, Online, August 2021

SERVICE

Reviewer for IEEE ICASSP (International Conference on Acoustics, Speech and Signal Processing), IEEE CDC (Conference on Decision and Control), IEEE ISIT (International Symposium on Information Theory), IEEE Signal Processing Letters, IEEE Transactions on Mobile Computing, AISTATS (International Conference on Artificial Intelligence and Statistics), IEEE Open Journal of Signal Processing, IEEE Transactions on Signal Processing, Signal Processing, Journal of Machine Learning Research