

Arpan Mukherjee

Electrical, Computer, and Systems Engineering
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Education

- Aug. 19-Present **Rensselaer Polytechnic Institute**, Troy, NY
Ph.D. candidate, Electrical, Computer and, Systems Engineering
Grade: 3.95/4
Advisor: Prof. Ali Tajer
- Jul. 17-May 19 **IIT Kharagpur**, West Bengal, India
M.Tech., Department of Electronics and Electrical Communication Engineering
GPA: 9.19/10
Thesis: *Improved Adaptive Filtering Algorithms for Block-sparse System Identification*
Advisor: Prof. Mrityunjoy Chakraborty
- Aug. 13-Jun. 17 **Maulana Abul Kalam Azad University of Technology**, West Bengal, India
B.Tech., Electronics and Communication Engineering
Grade: 9.05/10
Graduation Project: *Circuit and Layout Design of VLSI embedded Register File Array*
Advisor: Prof. Krishanu Datta

Work Experience

- Aug. 19-present **Rensselaer Polytechnic Institute**, Troy, NY
Research Assistant, Information Sciences Group
- Currently working on *efficient and optimal best arm identification* in stochastic Multi Armed Bandits
- Devised algorithms for *efficient best arm identification* in stochastic Multi Armed Bandits
- Devised algorithms for *robust best arm identification* in stochastic Multi Armed Bandits
- Developed an algorithm for *active binary classification* in random fields
- Developed an algorithm for *active learning* over networks
Advisor: Prof. Ali Tajer
- Jun. 23-Aug. 23 **IBM Thomas J. Watson Research Center**, NY
(Research Internship)
- Worked on combinatorial multi-armed bandits with group testing
- Analyzed and simulated a quantized Thompson sampling algorithm with group testing oracle
- Derived theoretical guarantees for linear reward functions
Collaborators: Shashanka Ubaru, Keerthiram Murugesan and Karthikeyan Shanmugam
Manager: Lior Horsesh
- Jun. 21-Aug. 21 **IBM Thomas J. Watson Research Center**, NY
(Research Internship)
- Worked on data-aware client selection in federated learning
- Designed client selection algorithms under data heterogeneity
- Clustering based on similarity between client gradients
Collaborators: Theodoros Salonidis, Shiqiang Wang and Georgios Kollias
Manager: Theodoros Salonidis
- Jul. 17-May 19 **IIT Kharagpur**, West Bengal, India
Digital Signal Processing Lab
- Devised algorithms for block-sparse system identification with application to spectrum sensing
- Devised an imputation-based unbiased LMS algorithm for system identification under missing input data
Advisor: Prof. Mrityunjoy Chakraborty

Selected Publications (Conferences)

- A. Mukherjee, S. Ubaru, K. Murugesan, K. Shanmugam and A. Tajer, “Combinatorial Multi-armed Bandits: Arm Selection via Group Testing”, submitted to the *Proc. International Conference on Artificial Intelligence and Statistics*, October 2023.
- A. Mukherjee and A. Tajer, “SPRT-based Best Arm Identification in Stochastic Bandits”, *Proc. IEEE International Symposium on Information Theory*, Helsinki, Finland, June 2022.
- A. Mukherjee, A. Tajer, P.-Y. Chen and P. Das, “Mean-based Best Arm Identification in Stochastic Bandits under Reward Contamination”, *Proc. Advances in Neural Information Processing Systems*, Virtual, December 2021.
- A. Mukherjee, A. Tajer, P.-Y. Chen and P. Das, “Active Binary Classification of Random Fields”, *Proc. IEEE International Symposium on Information Theory*, Melbourne, Australia, July 2021.
- A. Mukherjee, A. Tajer, P.-Y. Chen and P. Das, “Active Estimation from Multimodal Data”, *Proc. IEEE International Conference on Acoustics, Speech and Signal Processing*, Toronto, Canada, June 2021.

Selected Publications (Journals)

- A. Mukherjee and A. Tajer, “Best Arm Identification in Stochastic Bandits: Beyond β -optimality”, submitted to the *Transactions on Information Theory*, July 2023.
- A. Mukherjee and A. Tajer, “SPRT-based Efficient Best Arm Identification in Stochastic Bandits”, accepted in the *Journal on Selected Areas in Information Theory*, July 2023.
- Z. Yan, A. Mukherjee, B. Varici and A. Tajer, “Robust Causal Bandits for Linear Time-varying Models”, to be submitted to the *Journal of Selected Areas in Information Theory*, November 2023.
- A. Mukherjee, A. Tajer, P. Das and P.-Y. Chen, “Active Sampling of Multiple Sources for Sequential Estimation”, *IEEE Transactions on Signal Processing*, 70, pp.4571-4585, July 2022.
- S. Mukhopadhyay and A. Mukherjee, “ImdLMS: An Imputation based LMS algorithm for Linear System Identification with Missing Input Data,” *IEEE Transactions on Signal Processing*. vol. 68, pp. 2370-2385, 2020.

Awards/Fellowships

- Winner of the ISIT Information Theoretic Duets, 2022.
- B. Jayant Baliga '74 Graduate Student Fellowship Award, 2019-2020.
- MHRD PG Fellowship through GATE, 2017.

Selected Graduate Courses

- Stochastic Optimization & Reinforcement Learning
- Introduction to Optimization
- Pattern Recognition
- Distributed Systems & Sensor Networks (Learning)
- Detection & Estimation Theory
- Information Theory & Coding
- Digital Communication
- Adaptive Systems and Signal Processing

Related Course Projects

- Active Learning for Worker Selection in Distributed Stochastic Optimization
Implemented a distributed learning algorithm for parameter inference in a centralized setting. The server adaptively liaises with a single worker in each round, and a Multi Arm Bandit based selection policy is implemented to enhance the fidelity of the estimate with minimum variance.
- CT Image reconstruction using ADMM
Solved an ill-posed inverse problem which is also known to be sparse under certain transformation. Used ADMM under l_1 regularization with proximal gradient to reconstruct the original image.

- Matrix-Pattern based Ho-Kashyap Algorithm for data classification

Implemented a Matrix-Pattern based Ho-Kashyap algorithm for data classification and tested it on the MNIST dataset, UCI wine dataset, UCI air-quality dataset and UCI water-treatment dataset.

Programming Skills

Python, Pytorch, MATLAB,

Service

2021	Reviewer for NeurIPS 2021
2021	Reviewer for AAAI 2021
2021	Reviewer for AISTATS 2021
2022	Reviewer for AISTATS 2022
2023	Reviewer for AISTATS 2023
2023	Reviewer for IEEE Transactions on Information Theory
2022 - present	Reviewer for IEEE Transactions on Communications
2021 - present	Reviewer for IEEE Transactions on Mobile Computing
2019 - present	Reviewer for IEEE Transactions on Signal Processing