Avik Kar

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Info

Webpage `https://avik-kar.github.io/`
Github `https://github.com/avik-kar`
LinkedIn `https://www.linkedin.com/in/karavik18/`

Research Interests

My research interests broadly lie in the areas of reinforcement learning and online learning. Currently, my research focuses on designing low-complexity learning algorithms for complex systems, such as systems with cost constraints, non-Markovian systems, etc.

Education

Aug, 2021- July, 2026 (Tentative) **Indian Institute of Science, Bangalore**
PhD in Engineering, Dept of Computer Science and Automation , *Current course CGPA – **9.2/10***
- **Fellowship: Prime Minister's Research Fellowship** from *Aug 2022* to *Jul 2025*

Aug, 2019 - July, 2021 **Indian Institute of Technology Kharagpur**
M.Tech in Electrical Engineering with specialization in Instrumentation and Signal Processing, *CGPA – **9.15/10***
- **Thesis:** Federated Learning of Deep Neural Networks with Weakly Labelled Private Datasets
- **Award: Keshab K Parhi Endowment Prize** for **best application-oriented thesis** among M.Tech. graduating students of EECS division

2013—2017 **St. Thomas' College of Engineering and Technology, Kolkata**
B.Tech in Electronics and Communication Engineering , *Score – **8.54/10***
- **Thesis:** Microstrip Line Implementation of X-band Microwave Filter

Publications and Preprints

1. **Policy Zooming: Adaptive Discretization-based Infinite-Horizon Average-Reward Reinforcement Learning** link
   Authors: **Avik Kar** and Rahul Singh
   arXiv preprint arXiv:2405.18793. Accepted in the 40th Annual AAAI Conference on Artificial Intelligence.

2. **Provably Adaptive Average Reward Reinforcement Learning for Metric Spaces** link
   Authors: **Avik Kar** and Rahul Singh
   arXiv preprint arXiv:2410.19919. Accepted in the 41st Conference on Uncertainty in Artificial Intelligence.

3. **Fantom: Federated Adversarial Network for Training Multi-Sequence Magnetic Resonance Imaging in Semantic Segmentation** link
   Authors: Anupam Borthakur, Apoorva Srivastava, **Avik Kar**, Dipayan Dewan, and Debdoot Sheet
   International Conference on Image Processing (ICIP). IEEE, 2024.

4. **Linear Bandits With Side Observations on Networks** link
   Authors: **Avik Kar**, Rahul Singh, Fang Liu, Xin Liu, and Ness B. Shroff
   IEEE/ACM Transactions on Networking, 2024.

5. **Finite Time Logarithmic Regret Bounds for Self-Tuning Regulation** link
   Authors: Rahul Singh, Akshay Mete, **Avik Kar**, and P R Kumar
   41st International Conference on Machine Learning (ICML), 2024.

6. **Federated Learning for Site Aware Chest Radiograph Screening** link
   Authors: Arunava Chakravarty, **Avik Kar**, Ramanathan Sethuraman, and Debdoot Sheet
   18th International Symposium on Biomedical Imaging (ISBI). IEEE, 2021.

Talks and Presentations

April, 2025 Delivered a talk titled "Provably Adaptive Average Reward Reinforcement Learning for Metric Spaces" at **EECS Research Symposium**, IISc. Slides

Coursework

Postgraduate Optimization, Random Processes, Reinforcement Learning, Statistical Learning Theory, Online Learning, Analysis, Measure Theory, Queueing Theory, Stochastic Control, Statistical Signal Processing, Matrix Theory and Linear Algebra

Undergraduate Linear Algebra, Probability Theory, Signals and Systems, Control Systems, Digital Signal Processing, Analog Communication, Digital Communication

Technical Skills

Programming Languages Proficient: Python, C++, Matlab; Familiar: Java

Software Packages LaTeX, Pytorch, OpenAI Gym, Mujoco, Scikit-learn

Teaching

Spring, 2025 **Online Learning and Bandit Algorithms**. Role: Instructor.

Fall, 2024 **Reinforcement Learning**. Role: Teaching Assistant. Course link: `https://archive.nptel.ac.in/courses/106/106/106106143/`

Fall, 2023 **Bandit Algorithm (Online Machine Learning)**. Role: Teaching Assistant. Course link: `https://archive.nptel.ac.in/courses/106/101/110101145/`

Spring, 2023, 2024 **Markov Decision Processes**. Role: Instructor. Course link: `https://avik-kar.github.io/ta/index.html`

Fall, 2022 **Random Processes**. Role: Teaching Assistant. Course link: `https://ece.iisc.ac.in/~parimal/2022/random/`

Awards and Achievements

2022 Received **Prime Minister's Research Fellowship** from Aug, 2022 to Jul, 2025.

2021 Received **Keshab K Parhi Endowment Prize** for **best application oriented thesis** among M.Tech. graduating EECS students of IIT Kharagpur.

2020 Ranked 216 (99.74%ile) in GATE, Paper: EC

Professional Experiences

Aug 2017 – May 2018) **Nomura Research Institute Financial Technology India**
Role: Associate Software Engineer