Dheeraj Baby

https://dheeraj-b.github.io/home/ dheeraj@ucsb.edu

Research Interests

My research has been focused on developing **online learning** algorithms that can optimally cope with non-stationarities present in the environment. A common thread in my research involves reducing problems from general statistics / ML literature to ones that can be solved by online learning in a data-efficient manner. Applications of my work include forecasting trends in Time Series, dynamic pricing, design of adaptive real-time controllers for LQR systems, building recommender systems, signal processing etc.

Education

University of California, Santa Barbara
PhD student, Department of Computer Science *October 2018 - present*
Advisor: *Yu-Xiang Wang*

- CGPA : 4.0/4.0

Indian Institute of Technology Madras, Chennai, India *July 2011 - June 2016*
Dual Degree, Department of Electrical Engineering
Bachelor of Technology, Electrical Engineering
Master of Technology, Microelectronics & VLSI

Publications

Dheeraj Baby and Yu-Xiang Wang, "*Second Order Path Variationals in Non-Stationary Online Learning*", in Proceedings of 26th International Conference on Artificial Intelligence and Statistics (**AISTATS**) 2023.

Dheeraj Baby*, Jianyu Xu* and Yu-Xiang Wang, "*Non-stationary Contextual Pricing with Safety Constraints*", in Transactions of Machine Learning Research (**TMLR**) 2022 (*Equal contribution).

Dheeraj Baby and Yu-Xiang Wang, "*Optimal Dynamic Regret in LQR Control*", in Proceedings of 36th Conference on Neural Information Processing Systems (**NeurIPS**) 2022.

Dheeraj Baby and Yu-Xiang Wang, "*Optimal Dynamic Regret in Proper Online Learning with Strongly Convex Losses and Beyond*", in Proceedings of 25th International Conference on Artificial Intelligence and Statistics (**AISTATS**) 2022.

Dheeraj Baby and Yu-Xiang Wang, "*Optimal Dynamic Regret in Exp-Concave Online Learning*", in Proceedings of 34th Annual Conference On Learning Theory (**COLT**) 2021. (**Best student paper award**)

Dheeraj Baby, Xuandong Zhao and Yu-Xiang Wang, "*An Optimal Reduction of TV-Denoising to Adaptive Online Learning*", in Proceedings of 24th International Conference on Artificial Intelligence and Statistics (**AISTATS**) 2021.

Dheeraj Baby and Yu-Xiang Wang, "*Adaptive Online Estimation of Piecewise Polynomial Trends*", in Proceedings of 34th Conference on Neural Information Processing Systems (**NeurIPS**) 2020.

Dheeraj Baby and Yu-Xiang Wang, "*Online Forecasting of Total-Variation-bounded Sequences*", in Proceedings of 33rd Conference on Neural Information Processing Systems (**NeurIPS**) 2019.

Patents

Jason R. Baumgartner, Robert L. Kanzelman, Pradeep Kumar Nalla, Raj Kumar Gajavelly, **Dheeraj Baby**, "*Initial-state and next-state value folding*", US Patent# US10621297B1

Awards

Best student paper award at 34th Annual Conference On Learning Theory (COLT) 2021

Outstanding publication award 2021, from department of Computer Science, University of California Santa Barbara

Top 33% reviewer award at 37th International Conference on Machine Learning (ICML) 2020

Best paper honorable mention at Time Series workshop in ICML 2019

Invited Talks

Exploiting Curvature in Non-Stationary Online Learning with Applications to Pricing and Control, Nanjing University, China, 2022

Optimal Dynamic Regret in Exp-Concave Online Learning, at 34th Annual Conference On Learning Theory (COLT) 2021

Online Forecasting of Total-Variation-bounded Sequences at International Conference on Machine Learning (ICML) 2019 Time Series workshop

Industrial Experience

Student Researcher, Google Research India, Machine Learning and Optimization group, Jun 2022 - Sept 2022

Applied Scientist Intern, AWS AI Labs Palo Alto, Time Series forecasting group, Jun 2020 - Sept 2020

Software Developer, IBM India, 2016-2018

Academic Service

Reviewer for ICML19,20,21, AISTATS22,23, JMLR21,22,23

Programming Languages

C++, Python, Keras, PyTorch

Miscellaneous

In my free time, I enjoy running, swimming, playing tennis and reading Gita.