Vinod Raman

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https://vinodkraman.github.io

Education

University of Michigan — Ann Arbor, MI
PhD Student in Statistics — 2021 - Present
Thesis Advisor: Ambuj Tewari

University of Michigan — Ann Arbor, MI
BSE Computer Science, BSE Chemical Engineering — 2015 - 2020
Thesis Advisors: Mahdi Cheraghchi, Sindhu Kutty, Andrej Lenert

Publications

*denotes equal contribution

1. **V.Raman**, A.Tewari. Online Classification with Predictions. *Conference on Neural Information Processing Systems (NeurIPS)*, 2024.
   https://arxiv.org/abs/2405.14066

2. S.Hanneke*, **V.Raman***, A. Shaeiri*, U.Subedi*. Multiclass Transductive Online Learning. *Conference on Neural Information Processing Systems (NeurIPS)*, 2024. Spotlight.

3. **V.Raman***, U.Subedi*, A.Tewari. Smoothed Online Classification can be Harder than Batch Classification. *Conference on Neural Information Processing Systems (NeurIPS)*, 2024.
   https://arxiv.org/pdf/2405.15424

4. **V.Raman***, U.Subedi*, A. Raman, A.Tewari. Apple Tasting: Combinatorial Dimensions and Minimax Rates. *Conference on Learning Theory (COLT)*, 2024.
   https://arxiv.org/abs/2310.19064

5. **V.Raman***, U.Subedi*, A.Tewari. Online Learning with Set-Valued Feedback. *Conference on Learning Theory (COLT)*, 2024.
   https://arxiv.org/abs/2306.06247

6. **V.Raman***, U.Subedi*, A.Tewari. Online Infinite-Dimensional Regression: Learning Linear Operators. *Conference on Algorithmic Learning Theory (ALT)* 2024.
   https://arxiv.org/abs/2309.06548

7. A.Raman, **V.Raman***, U.Subedi*, I.Mehalel*, A.Tewari. Multiclass Online Learnability under Bandit Feedback. *Conference on Algorithmic Learning Theory (ALT)* 2024.
   https://arxiv.org/abs/2308.04620

8. **V.Raman***, U.Subedi*, A.Tewari. On Proper Learnability between Average- and Worst-case Robustness. *Conference on Neural Information Processing Systems (NeurIPS)* 2023.
   https://arxiv.org/abs/2211.05656

9. **V.Raman***, U.Subedi*, A.Tewari. On the Learnability of Multilabel Ranking. *Conference on Neural Information Processing Systems (NeurIPS)* 2023. Spotlight.
   https://arxiv.org/abs/2304.03337

10. S.Hanneke*, S.Moran*, **V.Raman***, U.Subedi*, A.Tewari. Multiclass Online Learning and Uniform Convergence. *Conference on Learning Theory (COLT)* 2023.
    https://arxiv.org/abs/2303.17716

11. **V.Raman**, A.Tewari. Online Agnostic Multiclass Boosting. *Conference on Neural Information Processing Systems (NeurIPS)* 2022.
https://arxiv.org/abs/2205.15113

12. **V.Raman**, T.Burger, A.Lenert. Design of thermophotovoltaics for tolerance of parasitic absorption. *Optics Express*, 27(22):31757–31772, 2019.
https://doi.org/10.1364/OE.27.031757

Works In Submission

1. H. Asi, **V.Raman***, K. Talwar. Faster Rates for Private Adversarial Bandits. *In Submission*, 2024

2. **V.Raman***, U.Subedi*, A.Tewari. A Unified Theory of Supervised Online Learnability. *In Submission*, 2024.
https://arxiv.org/abs/2307.03816

3. **V.Raman***, U.Subedi*, A.Tewari. A Characterization of Multioutput Learnability. *In Submission*, 2023.
https://arxiv.org/abs/2301.02729

Preprints

1. **V.Raman***, U.Subedi*, A.Tewari. The Complexity of Sequential Prediction in Dynamical Systems. *Preprint*, 2024.
https://arxiv.org/abs/2402.06614

2. **V.Raman***, D.Zhang*, Y.Jung, A.Tewari. Online Boosting for Multilabel Ranking with Top-k Feedback. *Preprint*, 2020.
https://arxiv.org/abs/1910.10937

Industry Experience

Apple Cupertino, CA
AIML Research Intern May - Aug. 2024

- Working with Kunal Talwar and Hilal Asi on differentially private adversarial bandits and privately tracking the best expert
- Working with Parikshit Gopalan on the communication complexity of uniform convergence

Amazon Seattle, WA
Software Engineering Intern May 2021

- Used React to design a mobile user dashboard for the Alexa Fashion team

Wove San Francisco, CA
Software Engineering Intern May - Aug. 2019

- Deployed bot-detection mechanism in Java and Ruby to improve the robustness of customer interaction data against web crawlers
- Engineered and deployed Beta distribution priors for estimating click-to-conversion rates of new ad-placements in Java
- Implemented contextual bandit algorithms for improving click-through-rate and helped design an off-policy bandit evaluation framework in Python

Awards & Scholarships

MSSISS Best Oral Presentation (University of Michigan) 2024
NeurIPS Scholar Award 2022-2023
Outstanding First-Year Ph.D. Student (University of Michigan) 2022
Departmental Outstanding GSI Team Award (University of Michigan) 2022
NSF Graduate Research Fellowship 2022
First-year Rackham Fellowship (University of Michigan) 2021
American Statistical Association Best Poster Award (University of Michigan) 2020
Landes Prize in Technical Communication (University of Michigan) 2019
Future Leaders In Chemical Engineering 2018
Bandemer Scholarship (University of Michigan) 2018
Pursley Scholarship (University of Michigan) 2017
A.H. White Scholarship (University of Michigan) 2017
James B. Angell Scholar (University of Michigan) 2017-2019
Dean's List (University of Michigan) 2015-2020

Talks

1. Lower Bounds for Differential Privacy Under Continual Observation and Online Threshold Queries. *COLT*, 2024.
2. Apple Tasting: Combinatorial Dimensions and Minimax Rates. *COLT*, 2024.
3. Trichotomies in Online Learnability. *Apple MLR Reading Group*, 2024
4. Revisiting the Learnability of Apple Tasting. *Michigan Student Symposium for Interdisciplinary Statistical Sciences (MSSISS)*, 2024.
5. Multiclass Online Learnability under Bandit Feedback. *ALT*, 2024.
6. Multiclass Online Learning and Uniform Convergence. *University of Michigan EECS Theory Seminar*, 2024.
7. On Classification-Calibration of Gamma-Phi Losses. *COLT*, 2023.

Teaching

PhD Math Workshop Ann Arbor, MI
Instructor Aug. 2023

- Taught a first-year Ph.D. math workshop focused on linear algebra and probability theory

Graduate Student Instructor Ann Arbor, MI
Instructor Aug. 2021 - May 2023

- Taught STATS 250, STATS 315, and STATS 507
- Led an interactive laboratory of 30+ students where I teach introductory statistics concepts
- Designed introductory deep learning course for statistics students

AI4ALL Ann Arbor, MI
Instructor May 2021 - Present

- Created interactive lecture material, programming exercises, and fun games on ML topics related to data wrangling and classification
- Lectured and led 30+ high school on data wrangling and classification
- Developed a novel way of introducing machine learning concepts to students via fill-in-the-blank coding notebooks, and received extremely positive feedback from students

InspiritAI Remote
Instructor May 2021 - Present

- Lectured 100+ high school students across the world on various ML topics including regression, classification, computer vision, and NLP
- Led 100+ high school students through "AI for social-good" projects, where my students built convolutional neural networks capable of detecting pneumonia from Xrays and emotions from faces
- Improved curriculum by identifying bugs in coding notebooks and adding information to lecture slides

Software

- **Programming:** Python, C++, Java, Javascript, Matlab, React Native
- **Frameworks:** PyTorch, Tensorflow, DialogFlow, MapReduce, Hadoop, Mockito

References

1. **Ambuj Tewari**, Professor, Statistics, University of Michigan, Ann Arbor MI, USA.
   Email: tewaria@umich.edu | *Phone*: 734-615-0928
2. **Steve Hanneke**, Assistant Professor, Computer Science, Purdue University, West Lafayette IN, USA.
   Email: steve.hanneke@gmail.com
3. **Mahdi Cheraghchi**, Associate Professor, Computer Science, University of Michigan, Ann Arbor MI, USA.
   Email: mahdich@umich.edu | *Phone*: 734-763-9165
4. **Sindhu Kutty**, Lecturer III, Computer Science, University of Michigan, Ann Arbor MI, USA.
   Email: skutty@umich.edu | *Phone*: 734-647-8821