Vinod Raman

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Education

University of Michigan — Ann Arbor, MI
PhD Student in Statistics — *2021 - Present*

University of Michigan — Ann Arbor, MI
BSE Computer Science, BSE Chemical Engineering — *2015 - 2020*
Summa Cum Laude

Selected Research Experiences

Probabilistic Robust PAC Learning — Ann Arbor, MI
Research under Prof. Ambuj Tewari — *Aug. 2022 - Present*

- Developing theory and algorithms behind the (PAC) learnability of function classes under the probabilistic robust classification risk
- Proved that (proper) learning under probabilistic robust risk can be difficult for function classes that are easy to learn under the standard 0-1 risk
- Currently designing algorithms that can achieve arbitrary probabilistic robust risk with finite number of training samples

Online Agnostic Multiclass Boosting — Ann Arbor, MI
Research under Prof. Ambuj Tewari — *May 2021 - May 2022*

- First to develop theory and algorithms for boosting weak multiclass online learners with marginally better than trivial regret to strong multiclass online learners with sub-linear regret in the agnostic setting
- Work led to first-author paper accepted to NeurIPS 2022

Online Boosting for Multilabel Ranking with Top-k Feedback — Ann Arbor, MI
Research under Prof. Ambuj Tewari — *May 2020 - Aug. 2021*

- Studied online boosting in the multi-label ranking setting when only user feedback on the top-k items is available
- Compared and contrasted several different randomized predictions procedures, and showed the superiority of the ϵ-greedy approach both theoretically and empirically on the asymptotic loss bound
- Submitted manuscript as joint first-author to AAAI 2022

Industry Experiences

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 multi-armed bandit algorithms for improving click-through-rate and helped design an off-policy bandit evaluation framework in Python

Vertex Pharmaceuticals — Boston, MA
Data Intern — *May - Aug. 2018*

- Built a standalone Matlab GUI automating the extraction, cleaning, visualization, and process control trending of raw continuous manufacturing data from Excel and OSIsoft PI databases
- Achieved a 92% reduction in labor hours in production

Preprints and Publications

*denotes equal contribution

1. **V.Raman**, A.Tewari. Online Agnostic Multiclass Boosting. *NeurIPS*, 2022. https://arxiv.org/abs/2205.15113
2. **V.Raman***, D.Zhang*, Y.Jung, and A.Tewari. Online Boosting for Multilabel Ranking with Top-k Feedback. *Preprint*, 2020. https://arxiv.org/abs/1910.10937
3. **V.Raman**, T.Burger, and 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

Presentations

1. **V.Raman**, S.Kutty, "Friend-or-Foe: Learning with Limited-Feedback and Mixed Quality Advice", Michigan Student Symposium for Interdisciplinary Statistical Sciences, Ann Arbor, MI, February 28, 2020 (Best Poster Award)
2. **V.Raman**, T.Burger, A.Lenert, "Impact of Heterogeneous Surface Absorption on Thin-Film Thermophotovoltaic Devices", Future Leaders in Chemical Engineering, Raleigh, NC, October 21-22, 2018 (Poster)

Awards, Scholarships & Honors

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

Skills

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