Vinod Raman

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Education

University of Michigan Ann Arbor, MI
BSE Computer Science, BSE Chemical Engineering *2015 - 2020*
GPA: 3.93/4.00
Coursework: Deep Learning for Vision, Machine Learning, Data Mining, Conversational AI, Cryptography, UI/UX Design, Data Structures and Algorithms, Discrete Mathematics, Thermodynamics, Fluid Mechanics, Mass and Heat Transport, Process Controls

Research Experience

Online Agnostic Multiclass Boosting Ann Arbor, MI
Research under Dr. Ambuj Tewari *Sept. 2020 - Present*

- Developing theory and algorithms for boosting online weak learners with marginally better than trivial regret to a strong learner with sublinear regret in the agnostic multiclass setting

Deletion-Robust Submodular Maximization Ann Arbor, MI
Research under Dr. Mahdi Cheraghchi *July 2020 - Present*

- Improving the state-of-the-art approximation algorithms for deletion-robust submodular maximization
- Proposed a novel *deterministic* algorithm that improves the approximation guarantee for the deletion of a single element to $1 - 1/e$
- Currently reducing the memory complexity as well as generalizing the algorithm for an arbitrary number of deletions

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

- Studied online boosting in the multi-label ranking setting when only user feedback on the top-k items are 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 AISTATS 2021

Friend-or-Foe: Learning with Limited-Feedback and Mixed Quality Advice Ann Arbor, MI
Research under Dr. Sindhu Kutty *July - Dec. 2019*

- Designed reputation-based multi-armed bandit algorithm for learning under limited feedback when advice from agents, who may or might not be malicious, is available
- Empirically demonstrated the robustness of our reputation system against several realistic manipulation attacks on recommender systems
- Presented work at the Michigan Student Symposium for Interdisciplinary Statistical Sciences and won American Statistical Association best poster award

Design of thermophotovoltaics for tolerance of parasitic absorption Ann Arbor, MI
Research under Dr. Andrej Lenert *May 2018 - Sept. 2019*

- Studied the impact of parasitic absorption defects on the performance of thin-film dual-junction thermophotovoltaic devices
- Built and trained a multivariable regression model to predict device robustness from module properties
- Published work as first author in peer-reviewed photonics journal Optics Express

Industry Experience

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

Teaching

Chemical and Engineering Thermodynamics Ann Arbor, MI
Tutor *Jan. - May 2018*

- Organized bi-weekly office hours and review sessions for 100+ students
- Helped create exam, quiz, and homework questions

Manuscripts/Publications

*denotes equal contribution

1. **V.Raman***, D.Zhang*, Y.Jung, and A.Tewari. Online Boosting for Multilabel Ranking with Top-k Feedback. *In Submission at AISTATS 2021*, 2020. `https://arxiv.org/abs/1910.10937`

2. **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

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 2017-2020
Dean's List 2015-2020

References

1. **Ambuj Tewari**, Associate Professor, Statistics, University of Michigan, Ann Arbor MI, USA.
   Email: tewaria@umich.edu | *Phone*: 734-615-0928
2. **Mahdi Cheraghchi**, Assistant Professor, Computer Science, University of Michigan, Ann Arbor MI, USA.
   Email: mahdich@umich.edu | *Phone*: 734-763-9165
3. **Sindhu Kutty**, Lecturer III, Computer Science, University of Michigan, Ann Arbor MI, USA.
   Email: skutty@umich.edu | *Phone*: 734-647-8821
4. **Andrej Lenert**, Assistant Professor, Chemical Engineering, University of Michigan, Ann Arbor MI, USA.
   Email: alenert@umich.edu | *Phone*: 734-647-4107