Pracheta Amaranath

University of Massachusetts-Amherst

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https://prachetaba.github.io/

RESEARCH INTERESTS

My research lies in the intersection of simulation and causal inference and seeks to build causal models of complex simulation systems.

EDUCATION

- **University of Massachusetts, Amherst** — Amherst, MA
  MS/Ph.D. in Computer Science; GPA: 3.94/4.0 — *Sep 2018 - Present*

- **Rastreeya Vidyalaya College of Engineering** — Bengaluru, India
  Bachelor of Engineering in Electrical and Electronics; GPA: 9.31/10.0 — *Aug 2011 - May 2015*

RESEARCH EXPERIENCE

- **Knowledge Discovery Lab** — Amherst-MA
  Graduate Research Assistant, Advisor: David Jensen — *Sept 2020 - Present*
    - Providing causal explanations for the actions of complex deep reinforcement learning agents.
    - Predicting the competence of a reinforcement learning agent using causal models of the agent's behavior.

- **DREAM Lab** — Amherst-MA
  Graduate Research Assistant, Advisor: Peter Haas — *Feb 2019 - Present*
    - Using maximum entropy, frequent itemset mining and machine learning to estimate prevalence of multiple chronic conditions and find rarely-occurring disease combinations in sparse data to inform better healthcare planning.

RESEARCH PUBLICATIONS

- **Pracheta Amaranath**, Sam Witty, Peter J. Haas, and David Jensen. *Causal Dynamic Bayesian Networks for Simulation Metamodeling*, To appear in Proceedings of the 2023 Winter Simulation Conference, December (2023).

- Laura B. Balzer, Erica Cai, Lucas Godoy Garraza and **Pracheta Amaranath**. *Adaptive Selection of the Optimal Strategy to Improve Precision and Power in Randomized Trials.* To appear in Biometrics (2023)

- Katherine Avery, Jack Kenney, **Pracheta Amaranath**, Erica Cai, and David Jensen. *Measuring Interventional Robustness in Reinforcement Learning*. arXiv preprint arXiv:2209.09058 (2022).

- **Pracheta Amaranath**, Ninad Khargonkar, Prasanna Srinivasan, Roshan Thaikkat, Hari Balasubramanian, Peter J. Haas. *Estimating the Prevalence of Multiple Chronic Diseases via Maximum Entropy.* (In progress)

- **Pracheta Amaranath**, Purva Pruthi, Amanda Gentzel, David D. Jensen. *Characterizing and Applying Methods for Constructing Observational Data to Evaluate Treatment Effect Estimators.* (In progress)

INDUSTRY EXPERIENCE

- **X, the moonshot factory** — Mountain View-CA
  AI Resident — *June 2023 - Jan 2024*
    - Simulation and experimental evaluation of a computational biology pipeline.

- **EBSCO Information Services** — Ipswich-MA
  Semantic Analysis and Modeling Intern — *May 2020 - August 2020*
    - Information retrieval and extraction of population and gender metadata from clinical text through machine learning models for identification and classification.
    - Topic modeling and polysemy detection for article classification for EBSCO's content database.

- **Massachusetts Dept. of Public Health** — Amherst, MA
  Data Science for the Common Good Fellow — *May 2019 - Aug 2019*
  - Worked on assessing health risks for communities in Massachusetts using social determinants of health.
  - Built a model that takes in social determinants as input data, reduces to a smaller subset of indicators (dimensionality reduction and factor analysis) to generate health scores for each community.
  - Deployed model to work on various subsets of data (determinants, health outcomes such as cardiovascular diseases, cancer, mortality rates, etc., specific domains such as economy, housing, personal health, violence, environment).
  - Ensured explain-ability of the approach to epidemiologists at the Dept. of Public Health.

- **Cisco Systems (India) Pvt. Ltd** — Bengaluru, India
  Systems Engineer — *July 2015 - July 2018*
  - Responsible for solution design, and testing of routing, switching, wireless and data center and network programmability initiatives.

Research Projects

- **University of Massachusetts, Amherst** — Amherst-MA
  Advisor: Peter Haas & David Jensen — *Sept 2021 - Present*
  - Developing causal models of complex simulation systems: Building causal metamodels of complex, discrete-event simulations in order to explain causal relationships in simulation models.

- **University of Massachusetts, Amherst** — Amherst-MA
  Advisor: David Jensen — *Sept 2021 - Present*
  - Benchmarking causal inference algorithms: A systematic evaluation of causal inference algorithms by using multiple constructed observational data sets and under multiple experimental settings.

Conferences and Presentations

- **(2023) Ph.D. Colloquium, Winter Simulation Conference**: Causal Dynamic Bayesian Networks for Simulation Metamodeling
- **(2021) INFORMS Annual Conference**: Estimating the prevalence of Chronic Diseases using the principle of Maximum Entropy
- **(2019) Grace Hopper Conference for Women in Computing**: Attendee
- **(2019) Women in Data Science - Central Massachusetts**: Estimating Chronic Diseases using the principle of Maximum Entropy
- **(2019) Data Science for the Common Good: Event Showcase (University of Massachusetts, Amherst)**: Assessing health risks for communities in Massachusetts (in collaboration with Mass. Dept. of Public Health and Data Science for Common Good)

Teaching Experience

- Teaching Assistant, Machine Learning, Spring 2023

- Teaching Assistant, Programming with Data Structures, Fall 2020

Courses

- Mathematical Statistics, Artificial Intelligence, Introduction to Causal Inference (Biostatistics), Reinforcement Learning, Simulation, Probabilistic Graphical Models, Machine Learning, Neural Networks, Systems for Data Science, Algorithms for Data Science, Research Methods in Empirical Data Science, Distributed and Operating Systems.

Programming Skills

- **Languages**: Python, R, C++, Matlab, Linux shell scripting, Java, MySQL, HTML, JavaScript

- **Frameworks and Libraries**: REST, Flask, Pandas, Numpy, Scipy, Scikit-learn, PyTorch, NetworkX

SERVICE

- Co-Founder, Voices of Data Science, University of Massachusetts, Amherst, 2020 - Present.

- Website Czar, Knowledge Discovery Lab, University of Massachusetts, Amherst, 2020-Present

- Masters Co-Chair, CS Women, University of Massachusetts, Amherst, 2019 – 2020

- Student Steering Committee, Researchers, Educators and Business Leaders of Massachusetts (REBLS), 2019-2020