AAKRITI KUMAR

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EDUCATION

PhD in Cognitive Science *2018 - 2023 (expected)*
University of California, Irvine
Advisor: Mark Steyvers

MS in Statistics *2018 - 2022 (expected)*
University of California, Irvine

BTech in Engineering *2011 - 2015*
Indian Institute of Technology, Madras

RESEARCH PROJECTS

Theory of Mind & Theory of Machine
Advisor: Mark Steyvers *Human-Computer Interaction*
Question: How do humans assess their ability, the ability of others, and how good they are at it?

- Developing Bayesian cognitive models to capture a human's assessment of their own and another agent's (human/AI) ability (data collected via a human subject study)

AI-assisted Decision Making
Advisor: Mark Steyvers *Human-Computer Interaction*
Question: Do humans form good mental models of AI assistance that is readily available?

- Developing a Bayesian cognitive model of participants' reliance behavior on AI agents of varying capabilities (in a noisy image classification task)

Algorithm Aversion & Metacognitive Bandits
Advisor: Mark Steyvers *Human-Computer Interaction*
Question: How do humans decide on when to ask for AI advice?

- Constructed new cognitive models (based on the bandit framework) of humans' advice seeking behavior when working with an AI assistant
- Demonstrated that algorithm aversion, a widely reported bias, can be explained as the result of a quasi-optimal sequential decision-making by the human

AI for Social Good: Improving Maternal Health Outcomes
Collaboration with Milind Tambe *Google Research - India*
Question: Do AI tools help increase engagement in a maternal healthcare program?

- Assessing the impact of deploying Restless Bandits to prevent drop-off from a maternal health information program for new and expectant mothers in India

Human-AI Complementarity
Advisor: Mark Steyvers, Padhraic Smyth *Human-Computer Interaction*
Question: Do humans and an AI agent show complementary ability at a Natural Language Understanding task?

- Designed and ran an interactive human subject experiment on Amazon MTurk, using HTML and JavaScript
- Carried out a comparative study of human performance and machine predictions to investigate complementary abilities of humans and machine

Trust between Humans and Machines
Advisor: Mark Steyvers *Human-Computer Interaction*
Question: What factors influence trust between humans and machines?

- Reviewed and synthesized existing literature on human-AI trust and collaboration.

Reliability in Inhibitory Control
Collaboration with Pradeep Shenoy, Google Research - India *Cognitive Control & Meta-Learning*
Question: Can flexible functions (RNNs) reliably identify people across sessions of a cognitive control task?

- Proposed and evaluated recurrent neural network models to learn individual-specific parameters in cognitive control task data

Learning and Forgetting in Lumosity Data
Advisor: Mark Steyvers, Aaron Benjamin (UIUC) *Human Learning*
Question: What is the effect of long delays between cognitive games on forgetting and skill learning?

- Analysed large-scale game play data from the Lumosity platform and proposed a computational model to characterise learning and forgetting behavior across individuals and cognitive tasks over time

Individual differences in Inhibition
Advisor: Jeff Rouder *Cognitive Control*
Question: Is inhibition a unified concept?

- Developed Bayesian hierarchical models to separate trial noise from other covariation in low signal, high-noise inhibition task data

PUBLICATIONS & PRESENTATIONS

Aakriti Kumar, Trisha Patel, Aaron Benjamin, Mark Steyvers (2021). Explaining Algorithm Aversion with Metacognitive Bandits
Cognitive Science 2021[paper]

Aakriti Kumar, Trisha Patel, Aaron Benjamin, Mark Steyvers (2021). Explaining Algorithm Aversion with Metacognitive Bandits
Workshop on Human-AI Collaboration in Sequential Decision-Making, ICML 2021

Aakriti Kumar, Trisha Patel, Aaron Benjamin, Mark Steyvers (2021). Metacognitive Bandits: When Do Humans Seek AI Assistance?
Social Intelligence in Humans and Robots Workshop, ICRA 2021

Aakriti Kumar, Aaron S. Benjamin, Andrew Heathcote, Mark Steyvers (2021). Comparing models of learning and relearning in large-scale cognitive training data sets [In submission]

Aakriti Kumar, Soumya Chatterjee, Pradeep Shenoy (2021). Meta-learning of Dynamic Policy Adjustments in Inhibitory Control Tasks [In submission]

Jeffrey N. Rouder, **Aakriti Kumar**, Julia M. Haaf (2019). Why Most Studies of Individual Differences With Inhibition Tasks Are Bound To Fail [preprint]

AWARDS AND FELLOWSHIPS

Irvine Initiative in AI, Law, and Society Fellowship 2022 *Total Award: $22,000*

Irvine Initiative in AI, Law, and Society Fellowship 2021 *Total Award: $22,000*

Graduate Dean's Recruitment Fellowship 2018, UCI *Total Award: $5000*

Recruitment Fellowship Award, 2018, Department of Cognitive Science, UCI *Total Award: $5000*

TEACHING EXPERIENCE

Teaching Assistant, UC Irvine: Probability and Statistics in Psychology I, II, III *Fall 2019 - Spring 2020*
Lead Teaching Assistant, UC Irvine: Introduction to Human Memory *Winter 2019*
Teaching Assistant, UC Irvine: Introduction to Psychology *Fall 2018*

SKILLS

Programming: Python (pandas, numpy, matplotlib, scikit-learn, pytorch, tensorflow), R, Stan, HTML/CSS

Research Methods: Experiment Design, Computational Cognitive Models, Generalised Linear Models, Bayesian Statistics, Probabilistic Learning, Deep Learning

PROFESSIONAL EXPERIENCE

Research Associate, IIT Madras *Mar'17 - May'18*
Consultant on analytics projects involving fraud detection.
Associate Program Manager, Ola cabs *Jun'15 - Aug'16*
Corporate Strategy & Process Excellence
Ola Store, City Manager (Chennai): Led a team of 40 employees to launch operations of hyper-local delivery services arm
Ola Airport Pickup Process (Bangalore, Mumbai): Designed a process for smooth passenger and driver movement. Worked with the product team to add driver side demand based alert features on the app

MEMBERSHIPS AND SERVICE

Department Colloquium Coordination Committee Member *2021 - 2022*

Cognitive Science Society Student Member

Psychonomic Society Student Member

Contributed to Advancing the Understanding of Attentional Control *Psychonomics 2018*