GitHub: RaviSoji

Ravi B. Sojitra

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EDUCATION

New York University, New York, NY 9/2018—Present

- *M.S. Applied Statistics* (concentration in Computational Methods)
- Award: 21st Century Scholarship

Rutgers University, Newark, NJ 9/2010—5/2014

- *B.A. Biology and Philosophy* (summa cum laude; GPA: 3.953/4.000)
- Honors Thesis: *Age Differences in Positive and Negative Probabilistic Feedback Learning*

Relevant Coursework

- Causal Inference, Messy Data & Machine Learning, Supervised and Unsupervised Machine Learning.

PROJECTS

Explainable Artificial Intelligence [DARPA XAI Program]

- Invented a procedure to convey image features used for classification via Probabilistic Linear Discriminant Analysis.
- Designed and implemented Bayesian teaching models to make model predictions and image categories interpretable.
- Designed Amazon Mechanical Turk experiments to evaluate the efficacy of the above approaches, with a team.
- Trained deep Generative Adversarial Networks to scale the above to explain modern image classifiers (e.g. ResNet).
- *Hardware*: Remote high performance computing clusters (GPU and CPU nodes), remote workstation computer.
- *Data*: ImageNet, CIFAR, MNIST, Child Affective Facial Expressions, and trial-by-trial data from human experiments.

Cyber-human Systems [NSF CISE]

- Implemented real time removal of horizontal and vertical content for augmented reality (i.e. Oculus Rift) experiments.
- Replicated, extended, and scaled the approach by Lee, Pederson, & Mumford (2003) from image to video.
- Analyzed video with Gabor filters, Discrete Cosine & Fourier transformations, and Dirichlet Process Mixture Models.
- *Data*: Video collected from head-mounted Point Grey cameras (Tamron CCTV lens).

RESEARCH (WORK) EXPERIENCE

Microsoft Research New York, NY

Research Intern | PIs: Drs. David Rothschild and Shawndra Hill *2/2019—5/2019*

- **Project**: Causal effects of TV advertisements on concurrent web search queries.

Cognitive and Data Science Laboratory Rutgers University, Newark, NJ

Research Technician | PI: Dr. Patrick Shafto *6/2016—2/2019*

- **Projects**: Explainable Artificial Intelligence, Cyber-human Systems, and Human-algorithm interaction.
- **Deliverables**: 1 conference paper and poster (both 1st author), 1 invention disclosure + provisional patent application.
- Supervised M.S. and undergraduate research projects.

Cognitive Neuroscience Laboratory Rutgers University, Newark, NJ

Research Assistant | PI: Dr. Mark A. Gluck *1/2012—6/2016*

- **Projects:** Cognitive aging, Genetics, and Exercise.
- **Deliverables:** 1 journal article (1st author), 1 editorial (2nd author), and 4 conference posters (all 1st author).
- Managed up to 7 researchers to collect and manage behavioral, genetic, and brain imaging data from 100s of people.
- Improved participant recruitment from 4 candidates/week to 35-50 candidates/week.

STATISTICS AND MODELING SKILLS

Causal Inference: propensity score, instrumental variable, and regression discontinuity approaches.
Classification: probabilistic, neural network, logistic regression, and random forest approaches.
Dimension Reduction: PCA, Linear Discriminant Analysis, Fourier Transform, DCT, and autoencoding approaches.
Non-parametric Clustering: Infinite Gaussian mixture models and Dirichlet Process Mixture models.

PROGRAMMING AND TECHNICAL SKILLS

Languages: Python, R/Rstudio, Bash scripting, Matlab, Java.
Software & Markup Languages: tmux, Conda, Vim, Jupyter, Git, Slurm & Markdown, LaTeX, Microsoft Office.
Operating Systems: Linux (Ubuntu), Unix/Mac OS, Windows 10.

Citations for all of my publications and presentations are also listed on my website.

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SERVICE

African American Brain Health Initiative Newark, NJ

Volunteer | >10 hours/week *1/2012—6/2016*

- Oversaw, participated in, and helped organize ~15 outreach events in Newark & Greater Newark Area for audiences of 20-100.
- Prepared and delivered talks on brain health, Alzheimer's disease, and research participation (including legal rights and ethics) at senior centers, publicly assisted housing centers, and churches in Newark, NJ.
- Helped mentor high school and college students to increase scientific literacy.

ARTICLES

1. Vong W. K.*, **Sojitra, R. B.***, Reyes, A. Yang, S. C-H., & Shafto, P. (2018). Bayesian teaching of image categories. *Proceedings of the 40th Annual Conference of the Cognitive Science Society.*
2. **Sojitra, R. B.*,** Lerner, I.*, Petok, J. R., & Gluck, M. A. (2018). Age affects reinforcement learning through dopamine-based learning imbalance and high decision noise – not through Parkinsonian mechanisms. *Neurobiology of Aging, 68, 102-113.*

EDITORIAL

1. Lerner, I., **Sojitra, R.**, & Gluck M. How age affects reinforcement learning. Aging (Albany). 2018 Nov 12. https://doi.org/10.18632/aging.101649 [Epub ahead of print].

CONFERENCE PRESENTATIONS

1. Vong W. K.*, **Sojitra, R. B.***, Reyes, A. Yang, S. C-H., & Shafto P. (2018, July). Bayesian teaching of image categories. Poster presented at the *40th Annual Meeting of the Cognitive Science Society*.
2. Richard, B., **Sojitra, R. B.**, Hansen, B. C., & Shafto, P. (2018, May). Defining non-linear processes in cross-orientation suppression (XOS) with steady state visual evoked potentials (SSEVPs). Poster presented at the *18th Annual Meeting of the Vision Sciences Society*.
3. Lerner, I.*, **Sojitra, R. B.***, Petok, J. R., & Gluck. M. A. (2017, November). Reinforcement learning in healthy aging: Similar behavior to Parkinson's disease, opposite mechanisms? Talk presented at the *47th Annual Meeting of the Society for Neuroscience.*
4. **Sojitra, R. B.*,** Vong, W.K.*, & Shafto, P. (2017, August). The Dynamics of Human Visual Experiences. Poster presented at the *1st Annual Conference on Cognitive Computational Neuroscience*.
5. **Sojitra, R. B.,** Simon, J. R., Gluck, M. A, & Lerner, I. (2016, August). Reinforcement learning model reveals age group differences in cognitive strategies for probabilistic categorization. Poster presented at the *38th Annual Meeting of the Cognitive Science Society (Neural Computation and Psychology Workshop)*.
6. **Sojitra, R. B.,** Inyang, C., Shaw, A., & Gluck, M. A. (2016, April). Medicating hypertension may improve learning from positive probabilistic feedback, in African Americans. Poster presented at the *23rd Annual Meeting of the Cognitive Neuroscience Society*.
7. **Sojitra, R. B.,** Simon, J. R., & Gluck, M. A. (2014, November). Adult age differences in "online" learning from positive and negative probabilistic feedback. Poster presented at the *44th Annual Meeting of the Society for Neuroscience*.

Citations for all of my publications and presentations are also listed on my website.