JAMSHID SOURATI

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ACADEMIC APPOINTMENTS

University of Chicago, Chicago IL   *November 2019 - Present*
Post-doctoral Researcher in the Department of Sociology, Knowledge Lab

Boston Children's Hospital, Harvard Medical School, Boston MA   *June 2017 - October 2019*
Post-doctoral Research Fellow in Radiology Department, Computational Radiology Laboratory

EDUCATION

Northeastern University, Boston MA   *January 2011 - December 2016*
Ph.D. in Electrical & Computer Engineering Department
• Received Dissertation Completion Fellowship (DCF) award for Fall 2016 from Northeastern University

Sharif Institute of Technology, Tehran, Iran   *September 2006 - September 2010*
B.Sc. in Electrical Engineering Department

RESEARCH INTEREST

Science of Science, Computational Social Science, Machine Learning, Active Learning, Data Science

RESEARCH EXPERIENCE

Social Analysis of Scientific Knowledge Discovery   *Nov 2019 - Present*
University of Chicago

- Incorporating distribution of expert in developing human and alien artificial intelligence algorithms for modeling scientific discoveries
- Our expert-aware model is able to predict discoveries that are likely to take place decades in the future (twice as precisely as the purely content-based algorithms),
- Our model can also generate disruptive, yet promising discovery candidates unlikely to be imagined by the scientists without machine intervention

Generic Active Learning (AL) Methods   *January 2012 - May 2017*
Northeastern University

- Developing unsupervised AL with pairwise constraints for spectral clustering, enabling AL-accelerated large image segmentation with naive features
- Addressing practical shortcomings of uncertainty sampling with more sophisticated information theoretical criteria:
- Deriving a novel theoretical relationship between Fisher Information Ratio (FIR) and the expected asymptotic variance of the maximum-likelihood estimator justifying usage of FIR-based AL for supervised learning
- Developing an efficient AL algorithm based on optimistic/pessimistic approximations of mutual information (MI) and using submodular properties of this information metric

Active Learning for Deep Models   *June 2017 - Sep 2019*
Boston Children's Hospital, Harvard Medical School

- Applying a tailored version of FIR-based AL with Fully Convolutional Neural Networks (FCNNs) for semantic image segmentation
- Successfully implementing and testing our method for brain extraction of data sets that lack enough annotations. Our model achieved high segmentation accuracy with significantly smaller annotation cost in comparison to various types of uncertainty sampling.

SELECTED PUBLICATIONS

- **J. Sourati**, J. A. Evans, "Accelerating Science with Human versus Alien Artificial Intelligences." arXiv preprint arXiv:2104.05188, 2021.
- **J. Sourati**, A. Gholipour, J. G. Dy, X. Tomas-Fernandez, S. Kurugol, S. K. Warfield, "Intelligent Labeling Based on Fisher Information for Medical Image Segmentation Using Deep Learning." IEEE Transactions on Medical Imaging, 2019.
- **J. Sourati**, M. Akcakaya, D. Erdogmus, T. K. Leen, J. G. Dy, "A Probabilistic Active Learning Algorithm based on Fisher Information Ratio." IEEE Transaction on Pattern Analysis and Machine Intelligence, vol. 40, no. 8, pp. 2023–2029, 2018.

- **J. Sourati**, A. Gholipour, J. G. Dy, S. Kurugol, S. K. Warfield, "Active Deep Learning with Fisher Information for Patch-wise Semantic Segmentation", Deep Learning in Medical Image Analysis and Multimodal Learning for Clinical Decision Support, pp. 83-91. Springer, 2018.
- **J. Sourati**, M. Akcakaya, T. K. Leen, D. Erdogmus, J. G. Dy, "Asymptotic Analysis of Active Learning Objectives based on Fisher Information." Journal of Machine Learning Research, vol. 18, no. 34, 2017.
- **J. Sourati**, M. Akcakaya, J. G. Dy, T. K. Leen, D. Erdogmus, "Classification Active Learning Based on Mutual Information." Entropy, vol. 18, no. 2, 2016.
- **J. Sourati**, D. Erdogmus, J. G. Dy, D. H. Brooks, "Accelerated Learning-Based Interactive Image Segmentation Using Pairwise Constraints," IEEE Transactions on Image Processing, vol.23, no.7, pp.3057–3070, 2014.
- M. Moghadamfalahi, M. Akcakaya, H. Nezamfar, **J. Sourati**, D. Erdogmus, "An Active RBSE Framework to Generate Optimal Stimulus Sequences in a BCI for Spelling," Signal Processing, IEEE Transactions on, 2017.
- **J. Sourati**, S. C. Kazmierczak, M. Akcakaya, T. K. Leen, J. G. Dy, D. Erdogmus, "Assessing Subsets of Analytes in Context of Detecting Laboratory Errors." EMBC, 2016.
- **J. Sourati**, D. Erdogmus, M. Akcakaya, S. C. Kazmierczak, T. K. Leen, "A Novel Delta Check Method for Detecting Laboratory Errors," IEEE International Workshop on Machine Learning for Signal Processing (MLSP), Boston, 2015.
- **J. Sourati**, K. Kose, M. Rajadhyaksha, J. G. Dy, D. Erdogmus, D. H. Brooks, "Automated localization of wrinkles and the dermo-epidermal junction in obliquely oriented reflectance confocal microscopic images of human skin." In Photonic Therapeutics and Diagnostics IX, vol. 8565, International Society for Optics and Photonics, 2013.
- M. Moghadamfalahi, **J. Sourati**, M. Akcakaya, H. Nezamfar, M. Haghighi, D. Erdogmus, "Active Learning for Efficient Querying from a Human Oracle with Noisy Response in a Language-Model Assisted Brain Computer Interface," IEEE International Workshop on Machine Learning for Signal Processing (MLSP), Boston, 2015.
- **J. Sourati**, D. H. Brooks, J. G. Dy, E. Ataer-Cansizoglu, D. Erdogmus, and M. Rajadhyaksha, "Unsupervised Wrinkle Detection in Reflectance Confocal Microscopy Images of the Human Skin." IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), pp. 705-708, 2012.
- **J. Sourati**, D. H. Brooks, J. G. Dy, and D. Erdogmus, "Constrained Spectral Clustering for Image Segmentation." IEEE International Workshop on Machine Learning for Signal Processing (MLSP), pp. 1-6, 2012.

COMMUNITY ACTIVITIES

- **Reviewing** submissions in Conference on Neural Information Processing Systems (NeurIPS), 2019.
- **Program committee member** in International Conference on Machine Learning (ICML), 2018.
- **Program committee member** in IEEE Machine Learning in Signal Processing Conference (MLSP), 2015.
- **Reviewing** submissions in International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI), 2018.
- **Reviewing** submissions in IEEE Transactions on Image Processing, IEEE Transactions on Medical Imaging.

SKILLS

Computer Languages	Python, MySQL, MATLAB, *familiar with:* bash shell scripting, Spark, R
Tools and Libraries	PyMySQL, TensorFlow, scikit-learn, GraphFrames, PySpark, CVXPY, CVXOPT, LaTeX, Git, Emacs, Anaconda, Sphinx, Jupyter, PGF/TikZ