Fredrik D. Johansson

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Current Research Interests

Machine learning methods and theory for causal and counterfactual inference, with applications to clinical and insured data.

Research positions

Postdoctoral Researcher *2017 -*
Institute for Medical Engineering & Science. Advisor: Prof. David Sontag.
Massachusetts Institute of Technology, USA

Education

Doctor of Philosophy in Computer Science *2016*
Computer Science & Engineering, Advisor: Prof. Devdatt Dubhashi
Chalmers University of Technology

Master of Science in Computer Science *2012*
Computer Science & Engineering, Advisor: Prof. Devdatt Dubhashi
Chalmers University of Technology and Findwise AB

Bachelor of Science in Engineering Physics *2010*
Department of Signals and Systems. Advisor: Prof. Thomas McKelvey.
Chalmers University of Technology

Publications

[1] U. Shalit, F D. Johansson, D. Sontag. Estimating individual treatment effect: generalization bounds and algorithms. In *Proc. of the International Conference on Machine Learning,* 2017

[2] A. Panahi, D. Dubhashi, F D. Johansson, C. Bhattacharyya Clustering by Sum of Norms: Stochastic Incremental Algorithm, Convergence and Cluster Recovery. In *Proc. of the International Conference on Machine Learning,* 2017

[3] F D. Johansson. Learning with geometric embeddings of graphs. *Doctoral thesis*, 2017

[4] F D. Johansson, U. Shalit, D. Sontag. Learning Representations for Counterfactual Inference. In *Proc. of the International Conference on Machine Learning*, 2016

[5] F D. Johansson, A. Chattoraj, C. Bhattacharyya, D. Dubhashi. Weighted Theta Functions

and Embeddings with Applications to Max-Cut, Clustering and Summarization. In *Proc. of Neural Information Processing Systems*, 2015.

[6] F D. Johansson, O. Frost, C. Retzner, and D. Dubhashi Classifying large graphs with differential privacy. In *Proc of Modeling Decisions for Artificial Intelligence*, 2015.

[7] L. Hermansson, F D. Johansson and O. Watanabe Generalized Shortest Path Kernel on Graphs. In *Discovery Science*, 2015.

[8] F. Johansson, D. Dubhashi. Learning with similarity functions on graphs using matchings of geometric embeddings. In *Proc. of the International Conference on Knowledge Discovery and Data Mining*, 2015.

[9] M. Kågebäck, F. Johansson, R. Johansson, D. Dubhashi. Neural context embeddings for automatic discovery of word senses. In *Proc of NAACL-HLT,* 2015.

[10] N. Tahmasebi, L. Borin, G. Capannini, D. Dubhashi, P. Exner, M. Forsberg, Gerhard Gossen, F. D. Johansson, R. Johansson, M. Kågebäck, O. Mogren, P. Nugues, T. Risse. Visions and Open Challenges for a Knowledge-Based Culturomics. In *International Journal on Digital Libraries,* 2015.

[11] F. Johansson, V. Jethava, D. Dubhashi, C. Bhattacharyya. Global graph kernels using geometric embeddings. In *Proc. of the International Conference on Machine Learning*, 2014.

[12] F. Axelsson, B. Rydback, F. Johansson, J. Bengtsson, S. Marinov. Data-driven Coreference Resolution for Swedish. In *Proc of the Swedish Language Technology Conference*, 2014.

[13] F. Johansson, V. Jethava, D. Dubhashi. DLOREAN: Dynamic LOcation- aware REconstruction of multiwAy Networks. In *Proc. of the International Conference on Data Mining Workshops*, 2013.

[14] T. Kerola, L. Hermansson, F. Johansson, V. Jethava, D. Dubhashi. Entity Disambiguation in Anonymized Graphs Using Graph Kernels. In *Proc of the International Conference on Information and Knowledge Management*, 2013.

[15] F. Johansson, T. Färdig, V. Jethava, and S. Marinov. Intent-aware temporal query modeling for keyword suggestion*. In Proc of the International Conference on Information and Knowledge Management Workshops*, 2012.

Teaching

Massachusetts Institute of Technology, MA, USA

Causal Inference & Deep Learning (Co-developer), 2018
Mini-course within the MIT IAP format with ~100 students. Co-taught with Max Shen.

Columbia University, NY, USA

Introduction to Machine Learning, (Guest lecture): SVMs & Kernels, 2015

Chalmers University of Technology, Sweden

Deep Learning (Co-developer), 2016
Full-length MSc and PhD level course in deep learning. Co-taught with Mikael Kågebäck and Olof Mogren. Flipped classroom format with ~30 students.

Algorithms for Machine Learning and Inference (Teaching assistant), 2015, 2016

Algorithms (Teaching assistant), 2012- 2016

Algorithms, Advanced Course (Teaching assistant)

Data structures (Teaching assistant), 2013, 2014

Honors and Awards

Sverige-Amerika Foundation Fellowship *2015-2016*

Adlerbertska Foundations Scholarship *2010*

Professional Activities

Research Visits

Visiting Research Scholar *2015-2016*
Hosted by Prof. David Sontag, Clinical Machine Learning Group
Department of Computer Science, New York University, NY USA

Visiting Research Scholar *2015*
Hosted by Prof. Tony Jebara, Columbia Machine Learning Lab
Department of Computer Science, Columbia University, NY, USA

Invited Talks

Causality and Learning for Intelligent Decision Making, Course at Cornell Tech, 2017

Deep Learning Symposium, NIPS, Barcelona 2016 (Invited as co-author. Did not give talk)

Göteborg Science Festival, Göteborg 2016
Machine Learning – What, how and why?

Machine Learning Seminars, Linköping University, Sweden, March 2016
What if…? Machine Learning and Causal Inference

Machine Learning Workshop, Chalmers University of Technology, Sweden, April 2016
Introduction to Machine Learning

Reviewer

International Conference on Artificial Intelligence and Statistics (AISTATS), 2018

Association for the Advancement of Artificial Intelligence (AAAI), 2016

Neural Information Processing Systems (NIPS), 2016, 2017

International Conference on Machine Learning (ICML), 2016, 2017

European Conference on Machine Learning and Principles and Practice of Knowledge Discovery, (ECML/PKDD), 2015, 2016

Student Volunteer

The 21st Conference of Knowledge Discovery and Data Mining, (KDD), 2015

Supervised MSc Theses

Henrik Alburg, *Tracking temporal evolution in word meaning with distributed word representations,* 2015

Jonatan Kilhamn, *Fast shortest-path kernel computations using approximate methods,* 2015

Kristoffer Tapper, *Learning to rank, a supervised approach for ranking of documents,* 2015

Otto Frost & Carl Retzner, *Graph Classification with Differential Privacy,* 2014

Linus Hermansson & T. Kerola, *Entity Disambiguation in Anonymized Graphs Using Graph Kernels,* 2013

References

Prof. David Sontag, New York University, NY, USA

Prof. Tony Jebara, Columbia University, NY, USA

Prof. Chiranjib Bhattacharyya, Indian Institute of Science, Bangalore, India

Prof. Devdatt Dubhashi, Chalmers University of Technology, Göteborg, Sweden