Fredrik D. Johansson

Massachusetts Institute of Technology
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Research Interests

Machine learning methods and theory for causal and counterfactual inference with applications to medical and insured data. I have also worked on machine learning for graph data, reinforcement learning, algorithmic fairness and natural language processing.

Appointments

2017– **Postdoctoral associate**
CSAIL & Institute for Medical Engineering & Science. Massachusetts Institute of Technology.

Visiting Positions

2015 **Visiting Research Scholar**
Clinical Machine Learning Group. Department of Computer Science, New York University.

2015 **Visiting Research Scholar**
Columbia Machine Learning Lab. Department of Computer Science, Columbia University.

Education

2017 **Ph.D.** Computer Science & Engineering. Chalmers University of Technology, Sweden. Advisor: Devdatt Dubhashi.

2012 **M.Sc.** Computer Science & Engineering. Chalmers University of Technology, Sweden.

2010 **B.Sc.** Engineering Physics. Chalmers University of Technology, Sweden.

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. KaÌŁgebaÌĹck, 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.

Pre-prints

1 O. Gottesman, F D. Johansson, et al. Evaluating Reinforcement Learning Algorithms in Observational Health Settings. In arXiv preprint arXiv:1805.12298, 2018.

2 I. Chen, F D. Johansson, D. Sontag. Why is my classifier discriminatory? In *Submission*, arXiv preprint arXiv:1805.12002, 2018

3 F D. Johansson, N. Kallus, U. Shalit, D. Sontag. Learning Weighted Representations for Generalization Across Designs. In *arXiv preprint arXiv:1802.08598*, 2018.

4 E. Jorge, M. Kågebäck, F D. Johansson, E. Gustavsson. Learning to Play Guess Who? and Inventing a Grounded Language as a Consequence. In arXiv preprint arXiv: 1611.03218, 2016.

Pedagogical Achievements

Teaching

Massachusetts Institute of Technology

2018 Causal Inference & Deep Learning (PhD-level). Co-developer.
Mini-course within the MIT IAP format with 70 students. Co-taught with Max Shen.

MIT Beavers Works Summer Institute
Guest lecture: Clinical Machine Learning

Cornell Tech

2017 Guest-lecture in Causality and Learning for Intelligent Decision Making (PhD-level).
Estimating Individual Treatment Effect: Generalization Bounds & Algorithms.

Columbia University

2015 Guest-lecture in Introduction to Machine Learning (BSc-level).
SVMs & Kernels

Chalmers University of Technology

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

2015–2016 Algorithms for Machine Learning and Inference (MSc-level). Teaching assistant.

2012–2016 Algorithms (MSc-level). Teaching assistant.

2012–2014 Algorithms, Advanced Course (MSc-level). Teaching assistant.

2013–2014 Data structures (BSc-level). Teaching assistant.

Student Supervision

Undergraduate Research Opportunities Program (UROP). MIT.

2018 Christina Ji. Sequential Decision Making in Healthcare.

MSc. Theses. Chalmers University of Technology.

2015 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.

2014 Otto Frost & Carl Retzner. Graph Classification with Differential Privacy.

2013 Linus Hermansson & Tommi Kerola. Entity Disambiguation in Anonymized Graphs Using Graph Kernels.

Pedagogy Courses

Teaching, Learning and Evaluation 3 HEC, Chalmers University of Technology

Professional Activities

Invited Talks (Selected)

2018 Empirical Investigations of Methods for Treatment Effect Heterogeneity, Atlantic Causal Inference Conference, Pittsburgh

2018 Counterfactual prediction & Domain Adaptation in High Dimensions, Atlantic Causal Inference Conference, Pittsburgh

2018 Causal Inference Primer, Broad Institute, Cambridge MA

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

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

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

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

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

Peer-review service (Selected)

Uncertainty in Artificial Intelligence (UAI)

International Conference on Artificial Intelligence and Statistics (AISTATS)

Association for the Advancement of Artificial Intelligence (AAAI)

Neural Information Processing Systems (NIPS)

International Conference on Machine Learning (ICML)

International Conference on Knowledge Discovery and Data Mining (KDD)

European Conference on Machine Learning and Principles and Practice of Knowledge Discovery.

Student Volunteer

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

2014 International Conference on Machine Learning (ICML)

Honors And Awards

2015 Sverige-Amerika Foundation Fellowship

2016 Adlerbertska Foundations Scholarship

References

David Sontag, Massachusetts Institute of Technology, MA, USA

Tony Jebara, Columbia University & Netflix, USA

Chiranjib Bhattacharyya, Indian Institute of Science, Bangalore, India

Devdatt Dubhashi, Chalmers University of Technology, Göteborg, Sweden

Last updated: June 6, 2018