

Moshe Looks

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Employment

Senior Software Engineer

Nov 2007 - Mar 2017

Google Inc.

Researched deep learning, generative models, active and semi-supervised learning, and program induction, with applications in search to web-ranking and knowledge graph curation. Was technical lead for a team of 3 engineers working on program induction and of 7 engineers working on generative models. Hosted 7 interns, conducted ~100 technical interviews.

Software Engineer

Jan 2002 - Oct 2007¹

Novamente LLC

Researched probabilistic-evolutionary learning, knowledge representation, AI algorithm integration, and data clustering. Applications included bioinformatics and intelligent virtual agents.

Software Engineer

Aug 2003 - Jun 2007²

Integrated Intelligence Solutions Operation

SAIC

Developed and applied a probabilistic-evolutionary learning system for time-series prediction, supervised categorization, and unsupervised pattern discovery. Applied natural language processing.

Research Assistant

Sep 2005 - Aug 2006

Ron Loui and John Lockwood

Washington University in St. Louis

Developed machine learning algorithms for text mining and natural language processing.

Research Assistant

Sep 2002 - Aug 2003

Weixiong Zhang

Washington University in St. Louis

Designed and experimentally validated local search algorithms, in collaboration with adviser.

Developer

Aug 2000 - Mar 2001

Wireless Mobile Advanced Push

Collaborated on the design and implementation of a web-based SMS broadcast management system.

Developer

Mar 2000 - Aug 2000

GoldNames Ltd.

Built a web-based system handling page generation, traffic analysis, etc., for >35,000 domain names.

Undergraduate Assistant

Jan 1999 - Mar 2000

Haim Levanon, Physical Chemistry

Hebrew University of Jerusalem

Assisted in experiments, data collection and analysis, and preparation of results for publication.

Degrees

Doctorate in Computer Science, Washington University in St. Louis, Dec 2006

Dissertation: Competent Program Evolution

Master's Degree in Computer Science, Washington University in St. Louis, May 2005

Thesis: Learning Computer Programs with the Bayesian Optimization Algorithm

Bachelor's Degree in Computer Science, The Hebrew University of Jerusalem, Jul 2002

Magna Cum Laude, Dean's List, 2000-2002, Senior Project: "Optimal Stereo Mosaicing"

¹part-time before Jun 2007

²on leave of absence Sep 2005 - Aug 2006

Moshe Looks

Research Area

Currently, deep learning and artificial general intelligence. Previously, generative models, program induction, statistical natural language processing, data clustering, and stochastic local search.

Software Development Skills

Generic, functional, object-oriented, and procedural paradigms, multiparadigm design, TDD
Awk, C, C++, Common Lisp, Java, JavaScript, Matlab, Perl, PHP, Python, Prolog, Scheme
primary languages are C++ and Python, primary development environment is Emacs
TensorFlow, Protocol Buffers, Google Flume (aka Cloud Dataflow), Eigen, SQL, NumPy, Bazel

Refereed Papers

1. Moshe Looks, Marcello Herreshoff, DeLesley Hutchins, and Peter Norvig “Deep Learning with Dynamic Computation Graphs”, *International Conference on Learning Representations (ICLR)*, 2017. Conference Track.
2. Viktoriya Krakovna and Moshe Looks “A Minimalistic Approach to Sum-Product Network Learning for Real Applications”, *International Conference on Learning Representations (ICLR)*, 2016. Workshop Track.
3. Cassio Pennachin, Moshe Looks, and João de Vasconcelos “Improved Time Series Prediction and Symbolic Regression with Affine Arithmetic”, *Genetic Programming Theory and Practice (GPTP)*, 2011.
4. Cassio Pennachin, Moshe Looks, and João de Vasconcelos “Robust Symbolic Regression with Affine Arithmetic”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2010.
5. Moshe Looks, “Compression Progress, Pseudorandomness, & Hyperbolic Discounting”, *Conference on Artificial General Intelligence (AGI)*, 2010.
6. Moshe Looks and Ben Goertzel, “Program Representation for General Intelligence”, *Conference on Artificial General Intelligence (AGI)*, 2009.
7. Ben Goertzel, Cassio Pennachin, Nil Geisweiller, Moshe Looks, Andre Senna, Welter Silva, Ari Heljakka, and Carlos Lopes “An Integrative Methodology for Teaching Embodied Non-Linguistic Agents”, *Conference on Artificial General Intelligence (AGI)*, 2008.
8. Moshe Looks, “Scalable Estimation-of-Distribution Program Evolution”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
9. Moshe Looks, “On the Behavioral Diversity of Random Programs”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
10. Moshe Looks, “Meta-Optimizing Semantic Evolutionary Search”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
11. Moshe Looks, Ben Goertzel, Lúcio de Souza Coelho, Mauricio Mudado, and Cassio Pennachin, “Clustering Gene Expression Data via Mining Ensembles of Classification Rules Evolved Using MOSES”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
12. Moshe Looks, Ben Goertzel, Lúcio de Souza Coelho, Mauricio Mudado, and Cassio Pennachin, “Understanding Microarray Data through Applying Competent Program Evolution”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2007.
13. Moshe Looks, Andrew Levine, Adam Covington, Ron Loui, John Lockwood, and Young Cho, “Streaming Hierarchical Clustering for Concept Mining”, *IEEE Aerospace Conference (AERO)*, 2007.
14. Moshe Looks, “Program Evolution for General Intelligence”, *Artificial General Intelligence Research Institute Workshop (AGIRI)*, 2006.

15. Moshe Looks, “Levels of Abstraction in Modeling and Sampling: The Feature-Based Bayesian Optimization Algorithm”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2006.
16. Ben Goertzel, Ari Heljakka, Stephan Vladimir Bugaj, Cassio Pennachin, and Moshe Looks, “Exploring Android Developmental Psychology in a Simulation World”, *International Cognitive Science Society, Android Science Workshop*, 2006.
17. Ben Goertzel, Moshe Looks, Ari Heljakka, and Cassio Pennachin, “Toward a Pragmatic Understanding of the Cognitive Underpinnings of Symbol Grounding”, *Semiotics and Intelligent Systems Development*, Ricardo Gudwin and João Queiroz, Eds., 2006.
18. Moshe Looks and Ben Goertzel, “Mixing Cognitive Science Concepts with Computer Science Algorithms and Data Structures: An Integrative Approach to Strong AI”, *AAAI Spring Symposium, Cognitive Science Principles Meet AI-Hard Problems*, 2006.
19. Moshe Looks, Ron Loui, and Barry Cynamon, “Dynamics of Rule Revision and Strategy Revision in Legislative Games”, *Conference on Legal Knowledge and Information Systems (JURIX)*, 2005.
20. Moshe Looks and Ron Loui, “On Game Mechanisms and Procedural Fairness: Preliminary Framework”, *Conference on Legal Knowledge and Information Systems (JURIX)*, 2005.
21. Weixiong Zhang and Moshe Looks, “A Novel Local Search Algorithm for the Traveling Salesman Problem that Exploits Backbones”, *International Joint Conference on AI (IJCAI)*, 2005.
22. Moshe Looks, Ben Goertzel, and Cassio Pennachin, “Learning Computer Programs with the Bayesian Optimization Algorithm”, *Genetic and Evolutionary Computation Conference (GECCO)*, 2005.
23. Moshe Looks, Ben Goertzel and Cassio Pennachin, “Novamente: An Integrative Architecture for General Intelligence”, *AAAI Fall Symposium, Achieving Human-Level Intelligence*, 2004.
24. Weixiong Zhang, Ananda Rangan, and Moshe Looks, “Backbone Guided Local Search for Maximum Satisfiability”, *International Joint Conference on AI (IJCAI)*, 2003.

Books

1. Jürgen Schmidhuber, Kristinn Thorisson, and Moshe Looks (editors), “Artificial General Intelligence. Proceedings of the 4th International Conference”, *Springer Lecture Notes in Artificial Intelligence (LNAI)*, 2011.

Invited Talks

1. “Artificial Intelligence – Potential and Risks”, *ACG Silicon Valley*, panel discussion, September 24th, 2015.
2. “Probabilistic Inference and Knowledge Graphs”, *AI+TECH, Institute for the Future*, February 25th, 2015.
3. “Mid-term Prospects for Machine Intelligence: Simple Statistical Models and Beyond”, *Winter Intelligence Conference, Future of Humanity Institute*, January 16th, 2011.
4. “Automated Program Learning for AGI”, *Conference on Artificial General Intelligence (AGI)*, tutorial, March 5th, 2010.
5. “Automated Program Learning for AGI”, *Conference on Artificial General Intelligence (AGI)*, tutorial, March 6th, 2009.
6. “Catalyzing the Coming AGI Renaissance”, *Conference on Artificial General Intelligence (AGI)*, panel discussion, March 3rd, 2008.
7. “The Future of Automated Program Learning”, *Washington DC Future Salon*, December 6th, 2006.
8. “Towards Competent Genetic Programming: What are the Missing Ingredients?”, *Missouri Estimation of Distribution Algorithms Laboratory (MEDAL) Gathering on Evolutionary Computation*, July 24th, 2006.

9. “Probabilistic Model-Building for Program Learning: The Challenge and Opportunity of a Complex Representation”, *Workshop on Optimization by Building and Using Probabilistic Models (OBUPM)*, July 9th, 2006.
10. “Contemporary Approaches to Symbol Grounding”, *Artificial General Intelligence Research Institute Workshop (AGIRI)*, May 21st, 2006.
11. “Frontiers of Evolutionary Computation”, *Artificial General Intelligence Research Institute Workshop (AGIRI)*, May 21st, 2006.

Open-Source Software

TensorFlow Fold, 2017.
Probabilistic Learning of Programs, 2008 - 2011.
Treetree library, 2008.
MOSES, 2007 - 2008.

Activities

Conference chair

Conference on Artificial General Intelligence (AGI), 2011.

Editorial board member

Journal of Artificial General Intelligence (JAGI), 2008 - 2014.

Reviewer

Journal of Machine Learning Research (JMLR), 2011.
IEEE Transactions on Evolutionary Computation (IEEE-TEC), 2008 and 2011.

Program committee member

International Joint Conference on AI (IJCAI), 2011.
Conference on Artificial General Intelligence (AGI), 2008 - 2016.
Genetic and Evolutionary Computation Conference (GECCO), 2007 - 2011.
Bio-Inspired Computing: Theories and Applications (BIC-TA), 2007.