

Bo Liu

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EDUCATION

2010 -2015 **Ph.D.** Computer Science, University of Massachusetts Amherst
Advisor: Sridhar Mahadevan
2008 -2010 **M.S.** Computer Engineering, Stevens Institute of Technology
2005 -2008 **M.S.** Control Engineering, University of Science and Technology of China

INDUSTRY EXPERIENCE

07/2016 - present	Assistant Professor	Auburn University, Auburn, AL
09/2015 - 04/2016	Research Staff Member	Philips Research, Cambridge, MA
06/2015 - 08/2015	Research Scientist Intern	Amazon Research, Seattle, WA
06/2013 - 09/2013	Machine Learning Scientist Intern	Amazon Research, Seattle, WA
06/2011 - 09/2011	Applied Research Intern	eBay Search Science, San Jose, CA

HONORS AND AWARDS

2017 Tencent Rhino-Bird Award, Tencent AI Lab
2016 ACM Doctoral Dissertation Award Nomination, by UMass Amherst
2015 Facebook Best Student Paper Award of UAI-2015
2013 Google Fellowship Nomination, by UMass Amherst
2012 NIPS Student Award
2012 UAI Student Scholarship
2010 ICNSC Doctoral Consortium Grant
2009 ICCNS Student Fellowship

RESEARCH INTEREST

Interactive Machine Learning

Reinforcement learning, Active learning, Online learning, and multi-armed bandit with application to online recommendation and spoken dialog system

Deep Learning

Deep Neural Networks theory, design, and applications

Large-Scale Efficient Optimization

Online/stochastic optimization with application to time-series problems including demand forecasting and transaction risk management

Transfer Learning

Multi-task learning and domain adaptation with application to multi-lingual machine translation and social network analysis

SELECTED PUBLICATIONS

Google Scholar: https://scholar.google.com/citations?hl=en&user=8MliTo4AAAAJ&view_op=list_works&sortby=pubdate

Stats: H-index: 11. Conference paper: 10, Journal paper: 10.

Topics: **TL:** transfer learning, **DL:** deep learning, **RL:** reinforcement learning, **SL:** sparse learning.

Conference Publications

- C1 Fangkai Yang, Daoming Lyu, **Bo Liu**, Steve Gustafson. PEORL: Integrating Symbolic Planning and Hierarchical Reinforcement Learning for Robust Decision-Making. *International Joint Conferences on Artificial Intelligence (IJCAI)*, 2018. (RL)
Acceptance rate: 20%(710/3470).
- C2 Hasan, S. A., **Bo Liu**, Liu, J., et.al. Neural Clinical Paraphrase Generation with Attention. *ClinicalNLP* 2016.
- C3 **Bo Liu**, Ji Liu, Luwan Zhang. Dantzig Selector with an Approximately Optimal Denoising Matrix. *Proceedings of the Conference on Uncertainty in AI (UAI)*, 2016. (SL,RL)
Acceptance rate: 31%(85/275).
- C4 **Bo Liu**, Ji Liu, Mohammad Ghavamzadeh, Sridhar Mahadevan, Marek Petrik. A Proximal Gradient Framework for Robust TD Learning. *International Joint Conferences on Artificial Intelligence (IJCAI)*, 2016. (TL,RL)
Acceptance rate: 24%(551/2294).
- C5 Deguang Kong, Ji Liu, **Bo Liu**, Xuan Bao. Uncorrelated Group Lasso. *Association for the Advancement of Artificial Intelligence (AAAI)*, 2016. (TL,SL)
Acceptance rate: 26%(549/2132).
- C6 **Bo Liu**, Ji Liu, Mohammad Ghavamzadeh, Sridhar Mahadevan, Marek Petrik. Finite-Sample Analysis of Proximal Gradient Algorithms. *Proceedings of the Conference on Uncertainty in AI (UAI)*, 2015, **Facebook Best Student Paper Award**. (TL,RL)
Acceptance rate: 1%(3/291) (Best paper award rate).
- C7 Ian Gemp, Sridhar Mahadevan, **Bo Liu**. Solving Large-Scale Sustainable Supply Chain Networks using Variational Inequalities, *AAAI Workshop on Computational Sustainability*, Austin, Texas, 2015.
- C8 **Bo Liu**, Sridhar Mahadevan, Ji Liu. Regularized Off-Policy TD-Learning. *26th Annual Conference on Neural Information Processing Systems (NIPS)*, Lake Tahoe, Nevada , 2012, December 3-6, **spotlight presentation**. (RL, SL)
Acceptance rate: 4%(72/1467) (Oral presentation rate).
- C9 Sridhar Mahadevan, **Bo Liu**. Sparse Q-learning with Mirror Descent. *Proceedings of the Conference on Uncertainty in AI (UAI)*, 2012. (RL, SL)
Acceptance rate: 31%(95/304).
- C10 Sridhar Mahadevan, **Bo Liu**. Basis Construction from Power Series Expansions of Value Functions. *24th Annual Conference on Neural Information Processing Systems (NIPS)*, Vancouver, B.C., Canada, 2010, December 6-8. (RL)
Acceptance rate: 24%(293/1219).
- C11 Haibo He, **Bo Liu**. A Hierarchical Learning Architecture with Multiple-Goal Representations Based on Adaptive Dynamic Programming *IEEE International Conference on Networking, Sensing and Control (ICNSC'10)*, Chicago, 2010. (RL)
- C12 **Bo Liu**, Haibo He, Daniel.Repperger. Two-Time-Scale Online Actor-Critic Paradigm Driven by POMDP. *IEEE International Conference on Networking, Sensing and Control (ICNSC'10)*, Chicago, 2010. (RL)

Journal Publications

- J1 Ai-Wen Jiang, **Bo Liu**, Ming-Wen Wang. Deep Multimodal Reinforcement Network with Contextually Guided Recurrent Attention for Image Question Answering *Journal of Computer*

Science and Technology, 32(4), 738-748, 2017.

Impact factor: 0.956.

- J2 Shuai Li, Yuesheng Lou, **Bo Liu**. Bluetooth aided mobile phone localization: a nonlinear neural circuit approach. *ACM Transactions on Embedded Computing Systems (ACM TECS)*, 2014. Impact factor: 1.190.
- J3 Shuai Li, **Bo Liu**, Yangming Li. Selective Positive-negative Feedback Produces the Winner-take-all Competition in Recurrent Neural Networks. *IEEE Transactions on Neural Networks and Learning Systems (IEEE TNNLS)*, 2013. (DL) Impact factor: 4.854.
- J4 Shuai Li, Sanfeng Chen, **Bo Liu**, Yangming Li, Yongsheng Liang Decentralized Kinematic Control of A Class of Collaborative Redundant Manipulators via Recurrent Neural Networks, *Neurocomputing*, 2012. (DL) Impact factor: 2471.
- J5 Shuai Li, Sanfeng Chen, **Bo Liu**. Accelerating a Recurrent Neural Network to Finite-Time Convergence for Solving Time-Varying Sylvester Equation by Using a Sign-Bi-power Activation Function, *Neural Processing Letters*, pp.1-17, 2012 (DL) Impact factor: 1.747.
- J6 Shuai Li, **Bo Liu**, Baogang Chen and Yuesheng Lou. Neural Network Based Mobile Phone Localization Using Bluetooth Connectivity. *Neural Computing and Applications*, 2012. Impact factor: 1.569.
- J7 Shuai Li, Hongzhu Cui, Yangming Li, **Bo Liu** and Yuesheng Lou. Decentralized Control of Collaborative Redundant Manipulators with Partial Command Coverage via Locally Connected Recurrent Neural Networks. *Neural Computing and Applications*, 2012. Impact factor: 1.569.
- J8 Shuai Li, Yunpeng Wang, Jiguo Yu, **Bo Liu**. A Nonlinear Model to Generate the Winner-take-all Competition. *Communications in Nonlinear Science and Numerical Simulation*, 2012. Impact factor: 2.866.
- J9 **Bo Liu**, Sanfeng Chen, Shuai Li, Yongsheng Liang Intelligent control of a sensor-actuator system via kernelized least-squares policy iteration. *Sensors* 12 (3), 2632-2653, 2012. Impact factor: 2.437.
- J10 Sanfeng Chen, Shuai Li, **Bo Liu**, Yuesheng Lou and Yongsheng Liang, Self-Learning Variable Structure Control for a Class of Sensor-Actuator Systems, *Sensors*, Vol.12, pp.6117-6128, 2012. Impact factor: 2.437.
- J11 **Bo Liu**, Haibo He, Sheng Chen. Adaptive Dual Network Design for a Class of SIMO Systems with Nonlinear Time-variant Uncertainties. *Acta Automatica Sinica*, Vol.36, pp.564-572, 2010. Impact factor: 1.290.

INVITED TALKS

Gradient, Semi-gradient and Pseudo-gradient Reinforcement Learning, SIAM Conference on Optimization, Vancouver, July 23th, 2017

Proximal Reinforcement Learning. SUNY Buffalo, Buffalo, NY, 2016

Proximal Reinforcement Learning. Auburn University, AL, 2016

Proximal Reinforcement Learning. Washington State University, Pullman, WA, 2015

Efficient Transfer Decision-making. Amazon Research, Seattle, WA, 2015

Efficient Transfer Decision-making. Philips Research, Briarcliff, NY, 2015

Sequential Decision Making Meets Big Data. Washington State University, Pullman, WA, 2013

First-Order Sparse Reinforcement Learning. Adobe Research, CA, 2012

ACADEMIC SERVICES

Associate Editor:

IEEE Geoscience and Remote Sensing Letters, ACM Transactions on Interactive Intelligent Systems (Program committee member)

Journal Review:

Machine Learning (MLJ), Artificial Intelligence (AIJ), IEEE Transactions on Neural Networks and Learning Systems (TNNLS), IEEE Signal Processing Letters, IEEE Transactions on Circuits and Systems for Video Technology (TCSVT), IEEE Transactions on Transactions on Autonomous Mental Development (TAMD), IET Image Processing, ACM Transactions on Interactive Intelligent Systems, Neurocomputing, Knowledge-Based Systems, Applied Soft Computing, Artificial Intelligence Review, Evolving Systems, Expert Systems with Applications, Journal of Classification, Pattern Analysis and Applications

Conference Review:

UbiComp 2015. AAAI 2016, 2017. IJCAI 2015, 2016, 2018. NIPS 2013 - 2017. AISTATS 2017, 2018. ICLR 2018. COLING 2018. COLT 2018

Program Committee:

AAAI 2017. IJCAI 2015, 2016, 2018.