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RESEARCH INTERESTS

Grammar Learning, Natural Language Processing, Machine Learning, Probabilistic Knowledge Representation, Computer Vision, Data Mining, Semantic Web

EDUCATION

- Ph.D. in Computer Science 2005-2012
Iowa State University, USA
Dissertation: Unsupervised Learning of Probabilistic Grammars
Adviser: Vasant Honavar
- Master in Computer Science and Engineering 2002-2005
Shanghai JiaoTong University, China
Thesis: Automatic Ontology Mapping by Combining Multiple Strategies
Adviser: Yong Yu
- Bachelor in Computer Science and Engineering 1998-2002
Shanghai JiaoTong University, China
Thesis: A Natural Language Understanding System Based on Conceptual Graph

EXPERIENCE

- Assistant Professor, School of Information Science and Technology, ShanghaiTech University, China, Feb. 2014 – Present
- Visiting Scholar, Department of Electrical Engineering and Computer Sciences, University of California, Berkeley, USA, Spring 2016
- Postdoctoral Researcher, Center for Vision, Cognition, Learning, and Art, Departments of Statistics and Computer Science, University of California, Los Angeles, USA, Jan. 2012 – Jan. 2014
- Research Assistant, Artificial Intelligence Research Laboratory, Computer Science Department, Iowa State University, USA, Spring & Fall 2009, Spring & Summer 2010, and Summer 2011
- Teaching Assistant, Computer Science Department, Iowa State University, USA, Fall 2005 – Fall 2011
- Intern, Microsoft Research Asia, Data Intelligence and Tools Group, Summer 2007 and Summer 2008

- Research Assistant, Apex Data & Knowledge Management Lab, Shanghai JiaoTong University, China, Fall 2001 – Spring 2005
- Teaching Assistant, Computer Science and Engineering Department, Shanghai JiaoTong University, China, Fall 2002 – Spring 2005

GRANTS

- Joint research of brain mechanism of language processing and computational modeling in artificial intelligence, Kewei Tu (Project Co-PI; PI of the sub-project “cross-discipline research at the syntactic level”) (Project PI: Zheng Zhang), Major Program of Science and Technology Commission Shanghai Municipal (STCSM), 2017-2018.
- Domain specific syntactic parsing, Kewei Tu (PI), Le Yan Inc., 2017.
- Extending stochastic grammars as general-purpose statistical models, Kewei Tu (PI), National Natural Science Foundation of China, 2016 – 2018.

PUBLICATIONS

Journal Papers

- Yanpeng Zhao, Yetian Chen, **Kewei Tu** and Jin Tian, "Learning Bayesian Network Structures Under Incremental Construction Curricula". In *Neurocomputing*, volume 258, pages 30–40, 2017.
- **Kewei Tu**, Meng Meng, Mun Wai Lee, Tae Eun Choe, and Song-Chun Zhu, "Joint Video and Text Parsing for Understanding Events and Answering Queries". In *IEEE MultiMedia*, vol. 21, no. 2, pp. 42-70, 2014.

Conference Papers

- Jun Mei, Yong Jiang and **Kewei Tu**, "Maximum A Posteriori Inference in Sum-Product Networks". In *the Thirty-Second AAAI Conference on Artificial Intelligence (AAAI 2018)*, New Orleans, Louisiana, USA, February 2–7, 2018.
- Chen Zhu, Yanpeng Zhao, Shuaiyi Huang, **Kewei Tu**, and Yi Ma, "Structured Attentions for Visual Question Answering". In *the International Conference on Computer Vision (ICCV 2017)*, Venice, Italy, October 22-29, 2017.
- Yong Jiang, Wenjuan Han, and **Kewei Tu**, "Combining Generative and Discriminative Approaches to Unsupervised Dependency Parsing via Dual Decomposition". In *the Conference on Empirical Methods in Natural Language Processing (EMNLP 2017)*, Copenhagen, Denmark, September 7–11, 2017.
- Wenjuan Han, Yong Jiang, and **Kewei Tu**, "Dependency Grammar Induction with Neural Lexicalization and Big Training Data". In *the Conference on Empirical Methods in Natural Language Processing (EMNLP 2017)*, Copenhagen, Denmark, September 7–11, 2017.
- Jiong Cai, Yong Jiang, and **Kewei Tu**, "CRF Autoencoder for Unsupervised Dependency Parsing". In *the Conference on Empirical Methods in Natural Language Processing (EMNLP 2017)*, Copenhagen, Denmark, September 7–11, 2017.
- Xiao Zhang, Yong Jiang, Hao Peng, **Kewei Tu**, and Dan Goldwasser, "Semi-supervised Structured Prediction with Neural CRF Autoencoder". In *the Conference*

on Empirical Methods in Natural Language Processing (EMNLP 2017), Copenhagen, Denmark, September 7–11, 2017.

- Shanbo Chu, Yong Jiang and **Kewei Tu**, "Latent Dependency Forest Models". In *the Thirty-First AAAI Conference on Artificial Intelligence (AAAI 2017)*, San Francisco, California, USA, February 4–9, 2017.
- Yanpeng Zhao, Shanbo Chu, Yang Zhou and **Kewei Tu**, "Sequence Prediction Using Neural Network Classifiers". In *the 13th International Conference on Grammatical Inference (ICGI 2016)*, Delft, the Netherlands, October 5-7, 2016.
- Lin Qiu, **Kewei Tu** and Yong Yu, "Context-Dependent Sense Embedding". In *the Conference on Empirical Methods in Natural Language Processing (EMNLP 2016)*, Austin, Texas, USA, November 1-5, 2016.
- Yong Jiang, Wenjuan Han and **Kewei Tu**, "Unsupervised Neural Dependency Parsing". In *the Conference on Empirical Methods in Natural Language Processing (EMNLP 2016)*, Austin, Texas, USA, November 1-5, 2016.
- **Kewei Tu**, "Modified Dirichlet Distribution: Allowing Negative Parameters to Induce Stronger Sparsity". In *the Conference on Empirical Methods in Natural Language Processing (EMNLP 2016)*, Austin, Texas, USA, November 1-5, 2016.
- **Kewei Tu**, "Stochastic And-Or Grammars: A Unified Framework and Logic Perspective". In *the 25th International Joint Conference on Artificial Intelligence (IJCAI 2016)*, New York City, USA, July 9-15, 2016. (Also accepted and presented at *the Sixth International Workshop on Statistical Relational AI (StarAI 2016)*, New York City, USA, July 11, 2016)
- Yanpeng Zhao, Yetian Chen, **Kewei Tu** and Jin Tian, "Curriculum Learning of Bayesian Network Structures". In *the 7th Asian Conference on Machine Learning (ACML 2015)*, Hong Kong, China, November 20-22, 2015.
- Maria Pavlovskaja, **Kewei Tu** and Song-Chun Zhu, "Mapping the Energy Landscape of Non-Convex Optimization Problems". In *the 10th International Conference on Energy Minimization Methods in Computer Vision and Pattern Recognition (EMMCVPR 2015)*, Hong Kong, China, January 13-16, 2015.
- **Kewei Tu**, Maria Pavlovskaja and Song-Chun Zhu, "Unsupervised Structure Learning of Stochastic And-Or Grammars". In *Advances in Neural Information Processing Systems 26 (NIPS 2013)*, Lake Tahoe, Nevada, USA, December 5-10, 2013.
- **Kewei Tu** and Vasant Honavar, "Unambiguity Regularization for Unsupervised Learning of Probabilistic Grammars". In *Proceedings of the 2012 Conference on Empirical Methods in Natural Language Processing and Natural Language Learning (EMNLP-CoNLL 2012)*, Jeju, Korea, July 12-14, 2012.
- **Kewei Tu** and Vasant Honavar, "On the Utility of Curricula in Unsupervised Learning of Probabilistic Grammars". In *Proceedings of the Twenty-second International Joint Conference on Artificial Intelligence (IJCAI 2011)*, Barcelona, Catalonia, Spain, July 16-22, 2011.
- **Kewei Tu**, Xixiu Ouyang, Dingyi Han, Yong Yu, and Vasant Honavar, "Exemplar-based Robust Coherent Biclustering". In *Proceedings of the 11th SIAM International Conference on Data Mining (SDM2011)*, Phoenix/Mesa, Arizona, USA, April 28-30, 2011.
- **Kewei Tu**, and Vasant Honavar, "Unsupervised Learning of Probabilistic Context-Free Grammar Using Iterative Biclustering". In *Proceedings of 9th International Colloquium on Grammatical Inference (ICGI 2008)*, LNCS 5278, St Malo, Brittany, France, September 22-24, 2008.

- **KeWei Tu**, Miao Xiong, Lei Zhang, HaiPing Zhu, Jie Zhang and Yong Yu, "Towards Imaging Large-Scale Ontologies for Quick Understanding and Analysis". In *Proceedings of the Fourth International Semantic Web Conference (ISWC2005)*, LNCS 3729/2005, Galway, Ireland, November 6-10, 2005.
- Jing Lu, Yong Yu, **Kewei Tu**, Chenxi Lin and Lei Zhang, "An Approach to RDF(S) Query, Manipulation and Inference on Databases". In *Proceedings of the 6th International Conference on Web-Age Information Management (WAIM2005)*, LNCS 3739/2005, Hangzhou, China, October 11-13, 2005.
- **KeWei Tu**, and Yong Yu, "CMC: Combining Multiple Schema-Matching Strategies based on Credibility Prediction". In *Proceedings of the 10th International Conference on Database Systems for Advanced Applications (DASFAA 2005)*, LNCS 3453, Beijing, China, April 17-20, 2005.
- Lei Zhang, Yong Yu, Jing Lu, Chenxi Lin, **KeWei Tu**, MingChuan Guo, Zhuo Zhang, GuoTong Xie, Zhong Su, and Yue Pan, "ORIENT: Integrate Ontology Engineering into Industry Tooling Environment". In *Proceedings of the 3rd International Semantic Web Conference (ISWC2004)*, LNCS 3298, Hiroshima, Japan, Nov.7-11, 2004.
- **Kewei Tu**, Jing Lu, Haiping Zhu, Guowei Liu, and Yong Yu, "A Semantic Search Approach by Graph Matching with Negations and Inferences". In *Proceedings of the 11th International Conference on Conceptual Structures (ICCS 2003)*, LNCS 2746, Dresden, Germany, July 21-25, 2003.

Workshop Papers

- **Kewei Tu**, "Towards a Unified Logic Perspective of Stochastic And-Or Grammars". In *ICML Workshop of Learning Tractable Probabilistic Models*, Beijing, China, June 26, 2014.
- **Kewei Tu**, "Combining the Sparsity and Unambiguity Biases for Grammar Induction". In *PASCAL Challenge on Grammar Induction, NAACL-HLT 2012 Workshop on Inducing Linguistic Structure*, Montréal, Canada, June 7, 2012.
- **Kewei Tu**, and Vasant Honavar, "An Empirical Study of Hierarchical Dirichlet Process Priors for Grammar Induction". In *NIPS Workshop of Grammar Induction, Representation of Language and Language Learning*, Whistler, Canada, December 11, 2009.

Theses

- Kewei Tu, "Unsupervised Learning of Probabilistic Grammars". *Ph.D. Dissertation*, Iowa State University, January 2012.
- KeWei Tu, "Automatic Ontology Mapping by Combining Multiple Strategies" (in Chinese). *Master Thesis*, Shanghai JiaoTong University, January 2005.
- KeWei Tu, "A Natural Language Understanding System Based on Conceptual Graph" (in Chinese). *Bachelor's Thesis*, Shanghai JiaoTong University, June 2002. [Excellent Undergraduate Thesis Award]

Technical Reports

- Maria Pavlovskaja, **Kewei Tu** and Song-Chun Zhu, "Mapping Energy Landscapes of Non-Convex Learning Problems". *Technical report*, September 2014.
- **KeWei Tu**, ChenXi Lin, and Yong Yu, "Complex-Mapping Oriented Schema Mapping Composition". *Technical report*, Shanghai JiaoTong University, September 2004.

INVITED TALKS

- "Unsupervised Grammar Learning", Shanghai University of Finance and Economics, Shanghai, China, September 2017.
- "Representation and Learning of Grammars Beyond the Language Domain", *ShanghaiTech Symposium on Information Science and Technology (SSIST)*, Shanghai, China, July 2017.
- "Theoretical Study of Stochastic And-Or Grammars", *Vision, Learning, and Cognition Workshop*, Microsoft Research Asia, Beijing, China, September 2016.
- "Stochastic And-Or Grammars: Representation & Learning", *Workshop: Frontiers in Knowledge Graphs*, Shanghai, China, December 2015.
- "Stochastic And-Or Grammars: Representation & Learning", School of Computer Science, Fudan University, Shanghai, China, May 2015.
- "Stochastic And-Or Grammars: Representation & Learning", *Symposium on Knowledge Graphs*, China Computer Federation Young Computer Scientists & Engineers Forum (CCF YOCSEF), Shanghai, China, May 2015.
- "Tutorial on Semantic Web", Shanghai Association of Information Sciences, Shanghai, China, November 2014.
- "Joint Inference of Video and Text", *Conference: A Meeting of the Minds: Computational Social Science*, Gould School of Law, University of Southern California, Los Angeles, California, USA, May 15, 2012.

AWARDS AND HONORS

- Excellence in Research Award, School of Information Science and Technology, ShanghaiTech University, 2016.
- Yanpeng Zhao, Shanbo Chu, Yang Zhou, Kewei Tu, 2nd place, the Sequence Prediction Challenge (SPiCe), the 13th International Conference on Grammatical Inference (ICGI), 2016.
- 1st place, PASCAL Challenge on Grammar Induction, the Dependency Induction Track, 2012.
- Teaching Excellence Award, Iowa State University, 2012.
- Professional Advancement Grant, Iowa State University, 2008, 2009, 2011.
- Excellent Undergraduate Thesis, Shanghai JiaoTong University, 2002.
- "Exceptional Student" of Shanghai JiaoTong University (Awarded to top 1% students), 2001.
- Scholarships when at Shanghai JiaoTong University: IBM Excellent Student Scholarship (2004), Scholarship of Chinese Academy of Sciences (2003), OOCL Scholarship (2001), Eaton Scholarship (2000), University Scholarship (1998-2001).

PROFESSIONAL SERVICES

- Conference/Workshop Organization Committee Member:

Program Chair, ShanghaiTech Symposium on Information Science and Technology (SSIST), 2017

ShanghaiTech Symposium on Information Science and Technology (SSIST), 2016

ShanghaiTech Symposium on Data Science (SSDS), 2015

- Conference/Workshop Program Committee Member / Reviewer:
 - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2016, 2017
 - Conference on Neural Information Processing Systems (NIPS), 2016
 - European Conference on Computer Vision (ECCV), 2016
 - AAAI Conference on Artificial Intelligence (AAAI), 2014, 2015
 - Vision Meets Cognition Workshop at CVPR 2014
 - International Joint Conferences on Artificial Intelligence (IJCAI), 2011, 2013
 - Midwest Artificial Intelligence and Cognitive Science Conference (MAICS), 2012, 2013
- Journal Reviewer:
 - Artificial Intelligence
 - Frontiers of Computer Science
 - Computational Intelligence
 - Fundamenta Informaticae
 - ETRI Journal