Kai Sun

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EDUCATION

Cornell University, USA — Aug. 2015 – Present
Ph.D., Computer Science
- Advisor: Claire Cardie

Shanghai Jiao Tong University, China — Sept. 2011 – June 2015
B.S., Computer Science (ACM Honored Class, Zhiyuan College)
- Rank **1st** in the ACM Honored Class

RESEARCH EXPERIENCE

Self-motivated Research

- Research on AI in Board Games — 2006 – Present
  - Designed *Yixin*, which is the strongest Gomoku and Renju AI in the world, champion of Gomocup 2012-2017, and the first Gomoku AI that outperformed the world champion human player.
  - Took over the organization of *Gomocup* from 2016, which is the most famous and largest gomoku AI tournament in the world.
  - More about Yixin: http://www.aiexp.info/pages/yixin.html
  - More about Gomocup: http://gomocup.org/

Research with Supervision

- Research on Belief and Sentiment Detection — June 2016 – Oct. 2017
  - *Mentor: Claire Cardie (Cornell University)*
  - Built hybrid systems to detect sentiments and beliefs in discussion forums and newswires with source and target, where sources are named entities and targets are named entities or events or relations.
  - Submitted systems for the Chinese and English BeSt Evaluation at the 2016 NIST TAC KBP, and ranked the 1st in 6 of 8 Chinese tasks, and 2 of 8 English tasks.
  - Submitted systems for the Chinese BeSt Evaluation at the 2017 NIST TAC KBP, and ranked the 1st in 7 of 8 Chinese tasks.
- Research on Dialogue Management — June 2013 – Aug. 2015
  - *Mentor: Kai Yu (Speech Lab, SJTU)*
  - Researched on improving the state of the art in tracking the state of spoken dialogue systems using both rule-based and statistical approaches.
  - Proposed two novel frameworks, referred to as *Constrained Markov Bayesian Polynomial (CMBP)* and *Recurrent Bayesian Polynomial (RPN)* respectively for dialogue state tracking.
  - Participated in the 2nd Dialog State Tracking Challenge (DSTC-2) and ranked the 3rd.
  - Participated in the 3rd Dialog State Tracking Challenge (DSTC-3) where our method was found to be one of the top three tracking methods (ranked 1st/2nd/3rd in "requested slots"/"method"/"joint goals" respectively), and was one of the only two methods that outperformed all four baselines of the challenge.
  - Participated in the 4th Dialog State Tracking Challenge (DSTC-4) and ranked the 2nd.
- Research on Speech Synthesis — Aug. 2014 – Feb. 2015

  - *Mentors: Frank Soong and Lijuan Wang (Speech Group, MSRA)*
  - Built a Recurrent Neural Network (RNN)-based text-to-speech (TTS) synthesis system which supports multi-task learning (MTL).
  - Investigated how to control the age dimension of RNN-based TTS models by applying MTL and matrix decomposition.
  - Studied on handling head stabilization and registration problem of 3D talking head using some computational geometry algorithms and computer vision algorithms such as Iterative Closest Point (ICP).

- Research on Machine Learning July 1, 2014 – July 31, 2014
  - *Specialty Practice organized by John Hopcroft (Cornell University)*
  - Compared the framework with both traditional rule-based approaches and statistical approaches.
  - Refined the theory of *Constrained Markov Bayesian Polynomial (CMBP).*

- Assessment of the Academic Impact of Different Countries and Institutions Dec. 2012 – Jan. 2013
  - *Mentor: John Hopcroft (Cornell University)*
  - Mined researchers' information from DBLP and search engines such as Google Scholar and Microsoft Academic Search.
  - Extracted useful information and assessed the academic impact of different countries and institutions.

- Research on Swarm Intelligence Feb. 2012 – Oct. 2012
  - *Mentor: Alei Liang (Embedded Lab, SJTU)*
  - Investigated to build a system to track robots' routes with camera, which could help fetch useful data for the analysis of swarm intelligence experiments.

PUBLICATIONS

Journal Papers

- **Kai Sun**, Qizhe Xie and Kai Yu. Recurrent Polynomial Network for Dialogue State Tracking. Dialogue and Discourse (D&D). 2016.
- Kai Yu, Lu Chen, **Kai Sun**, Su Zhu and Qizhe Xie. Evolvable Dialogue State Tracking for Statistical Dialogue Management. Frontiers of Computer Science. 2015.
- Kai Yu, **Kai Sun**, Lu Chen and Su Zhu. Constrained Markov Bayesian Polynomial for Efficient Dialogue State Tracking. IEEE/ACM Transactions on Audio, Speech and Language Processing (TASLP). 2015.
- Kai Yu, Lu Chen, Bo Chen, **Kai Sun** and Su Zhu. Cognitive Technology in Task-Oriented Dialogue Systems – Concepts, Advances and Future. Chinese Journal of Computers. 2014. (**Invited paper**)

Peer Reviewed Conference Papers

- **Kai Sun**, Su Zhu, Lu Chen, Siqiu Yao, Xueyang Wu, Kai Yu. Hybrid Dialogue State Tracking for Real World Human-to-Human Dialogues. Interspeech. 2016.
- Qizhe Xie, **Kai Sun**, Su Zhu, Lu Chen and Kai Yu. Recurrent Polynomial Network for Dialogue State Tracking with Mismatched Semantic Parsers. 16th Annual SIGdial Meeting on Discourse and Dialogue (SIGDIAL). 2015.
- Su Zhu, Lu Chen, **Kai Sun**, Da Zheng and Kai Yu. Semantic Parser Enhancement for Dialogue Domain Extension with Little Data. IEEE Spoken Language Technology Workshop (SLT). 2014.
- **Kai Sun**, Lu Chen, Su Zhu and Kai Yu. A Generalized Rule Based Tracker for Dialogue State Tracking. IEEE Spoken Language Technology Workshop (SLT). 2014.
- **Kai Sun**, Lu Chen, Su Zhu and Kai Yu. The SJTU System for Dialog State Tracking Challenge 2. 15th Annual SIGdial Meeting on Discourse and Dialogue (SIGDIAL). 2014.

Technical Reports

- **Kai Sun** and Claire Cardie. Cornell Belief and Sentiment System at TAC 2017. Text Analysis Conference (TAC). 2017.
- Mohamed Al-Badrashiny, Jason Bolton, Arun Tejavsi Chaganty, Kevin Clark, Craig Harman, Lifu Huang, Matthew Lamm, Jinhao Lei, Di Lu, Xiaoman Pan, Ashwin Paranjape, Ellie Pavlick, Haoruo Peng, Peng Qi, Pushpendre Rastogi, Abigail See, **Kai Sun**, Max Thomas, Chen-Tse Tsai, Hao Wu, Boliang Zhang, Chris Callison-Burch, Claire Cardie, Heng Ji, Christopher Manning, Smaranda Muresan, Owen C. Rambow, Dan Roth, Mark Sammons and Benjamin Van Durme. TinkerBell: Cross-lingual Cold-Start Knowledge Base Construction. Text Analysis Conference (TAC). 2017.
- Vlad Niculae, **Kai Sun**, Xilun Chen, Yao Cheng, Xinya Du, Esin Durmus, Arzoo Katiyar and Claire Cardie. Cornell Belief and Sentiment System at TAC 2016. Text Analysis Conference (TAC). 2016.

HONORS AND AWARDS

- **Winner of the 13th, 14th, 15th, 16th, 17th, 18th Gomocup**, 2012-2017
- **University Fellowship**, Cornell University, 2015
- **Excellent Bachelor Thesis (Top 1%)**, Shanghai Jiao Tong University, 2015
- **Zhiyuan Excellent Student Scholarship**, Shanghai Jiao Tong University, 2015 (highest honor in Zhiyuan College)
- **Outstanding Graduate Award**, Shanghai Jiao Tong University, 2015
- **Award of Excellence of MSRA Star of Tomorrow Internship Program**, 2015
- **National Scholarship**, 2014 (highest scholarship in China, awarded to top 1% students)
- **Microsoft Young Fellow Scholarship Award**, 2014 (39 undergraduate&graduate students in China)
- **Google Excellence Scholarship**, 2014 (58 undergraduate&graduate students in China)
- **Shanghai Government Scholarship**, 2013 (1 student in the ACM Honored Class)
- **Chun-Tsung Scholarship**, 2013 (1 student in the ACM Honored Class)
- **Academic Excellence Scholarship (First-Class)**, Shanghai Jiao Tong University, 2012 (awarded to top 1% students)
- **KoGuan Scholarship**, 2012 (55 undergraduate students in SJTU)
- **First Prize**, National High School Math League, 2010
- **Silver Medal**, National Olympiad in Informatics (NOI), 2010

TEACHING EXPERIENCE

- Fall 2017: Teaching Assistant in CS 4740/5740 Introduction to Natural Language Processing
- Fall 2016: Teaching Assistant in CS 4740/5740 Introduction to Natural Language Processing
- Summer 2016: Teaching Assistant in CS 2110 Object-Oriented Programming and Data Structures
- Spring 2015: Teaching Fellow in Compiler Design and Implementation (Lecturer)
- Fall 2013: Teaching Fellow in Introduction to Computer Science (Lecturer)
- Fall 2012: Teaching Assistant in Introduction to Computer Science (Lecturer)