

JAESIK CHOI – Curriculum Vitae

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Education

- **University of Illinois Urbana-Champaign**, Ph.D in Computer Science, 2005–May 2012.
Thesis title: *Lifted Inference for Relational Hybrid Models*.
Research advisor: Eyal Amir
- **Seoul National University**, B.S. in Computer Engineering, *cum laude*, 1997–2004.

Research Interests

Inference and Learning in Large-Scale Graphical Models, with emphasis on **intelligent hybrid systems**. My technical work is divided among three areas: (a) scaling up probabilistic inference for large-scale hybrid systems, (b) machine learning for dynamic relational models, and (c) a noble combination of Artificial Intelligence (AI) planning and robot motion planning. Examples of my works include tracking and monitoring dynamic systems, and learning graphical models for real-world environmental data. Recent applications of my work include groundwater modeling, video retrieval, robot planning, tractable sensing decisions, image-based email filtering, and web monitoring.

Research Experience

- **SRI International**. Summer Intern as Student Associate. *Created efficient inference algorithms for large-scale graphical models* with Rodrigo de Salvo Braz and Hung Bui. Published a paper in **AAAI-11**. 2010.
- **Yahoo! Inc. Labs**. Summer Intern. *Designed and implemented a feature estimation algorithm using matrix factorization for large scale web data*, with Hao Zheng and Jianchang Mao. 2008.
- **Yahoo! Inc. Mail**. Summer Intern. *Invented algorithms to block spam mails using artificial intelligence and Machine Learning techniques* with Hao Zheng, Vish Ramarao and Jitendra Malik (Yahoo! Research Berkeley). Invented **two US Patents, #8055078 and #7849146**. 2007
- **Korea Institute Science and Technology (KIST) & Korea University**. Research Programmer. *Designed and implemented an algorithm that controls a mobile robot for safe navigation* with Woojin Chung. Published a paper in IEEE Transactions on Industrial Electronics. 2004–2005

Patents

- **J. Choi**, K. Wei, and V. Ramarao, *Filter For Blocking Image-Based Spam*, United States Patent No.: US 8055078, 2011.
- **J. Choi**, J. Pujara, V. Ramarao, and K. Wei, *Identifying IP Addresses For Spammers*, United States Patent No.: US 7849146, 2010.

Papers and Publications

Thesis

- [1] **J. Choi**, *Lifted Inference for Relational Hybrid Models*, Ph.D. Thesis, University of Illinois at Urbana-Champaign, Department of Computer Science, 2012.

Journal Papers

- [2] W. Chung, S. Kim, M. Choi, **J. Choi**, H. Kim, C. Moon, and J.-B. Song, *Safe Navigation of a Mobile Robot Considering Visibility of Environment*, *Industrial Electronics, IEEE Transactions on*, Vol 56(10), pp. 3941 -3950, 2009.

Proceedings of Peer-Refereed Conferences

- [3] T. Xu, A. J. Valocchi, **J. Choi** and E. Amir *Improving Groundwater Flow Model Prediction Using Complementary Data-Driven Models*, in XIX International Conference on Computational Methods in Water Resources (**CMWR 2012**), 2012.
- [4] **J. Choi**, R. de Salvo Braz, and H. Bui, *Efficient Methods for Lifted Inference with Aggregate Factors*, in Proceedings of the 25th AAAI Conference on Artificial Intelligence (**AAAI-11**), 2011.
- [5] **J. Choi**, A. Guzman-Rivera, and E. Amir, *Lifted Relational Kalman Filtering*, in Proceedings of the 22nd International Joint Conference on Artificial Intelligence (**IJCAI-11**), 2011.
- [6] **J. Choi**, D. J. Hill, and E. Amir, *Lifted Inference for Relational Continuous Models*, in Proceedings of the 26th Conference on Uncertainty in Artificial Intelligence (**UAI 2010**), 2010.
- [7] H. Hajishirzi, A. Shirzi, **J. Choi**, and E. Amir, *Greedy Algorithms for Sequential Sensing Decisions*, in Proceedings of the 21st International Joint Conference on Artificial Intelligence (**IJCAI-09**), 2009.
- [8] **J. Choi** and E. Amir, *Combining Planning and Motion Planning*, in Proceedings of 2009 IEEE International Conference on Robotics and Automation (**ICRA2009**), 2009.
- [9] **J. Choi**, W. Jeon, and S.-C. Lee, *Spatio-Temporal Pyramid Matching for Sports Videos*, in Proceedings of ACM International Conference on Multimedia Information Retrieval (**MIR2008**), 2008.
- [10] **J. Choi** and E. Amir, *Factor-Guided Motion Planning for a Robot Arm*, in Proceedings of the 2007 IEEE International Conference on Intelligent Robots and Systems (**IROS2007**), 2007.
- [11] **J. Choi**, W. Chung, and J.-B. Song, *Efficient navigation of mobile robot based on the robot's experience in human co-existing environment*, in Proceedings of 2005 International Conference on Control, Automation and Systems (**ICCAS 2005**), 2005.

Workshop Papers and Abstracts

- [12] **J. Choi** and E. Amir, *Combining Planning and Motion Planning: An Extended Abstract*, in ICAPS'10 Workshop on Combining Action and Motion Planning (CAMP 2010), 2010. (**Invited paper**)
- [13] **J. Choi** and E. Amir, *Combining Planning and Motion Planning with an Action Formalism*, in 9th Symposium on the Logical Formalizations of Commonsense Reasoning (Commonsense 2009), 2009.
- [14] **J. Choi** and E. Amir, *Factored Planning for Controlling a Robotic Arm: Theory*, in 5th International Cognitive Robotics Workshop (CogRob 2006), 2006.
- [15] Y. Liu, D. Hill, T. Abdelzaher, J. Heo, **J. Choi**, B. Minsker, and D. Fazio, *Virtual Sensor-Powered Spatiotemporal Aggregation and Transformation: A Case Study Analyzing Near-Real-Time NEXRAD and Precipitation Gage Data in a Digital Watershed*, in Environmental Information Management, 2008.

- [16] W. Chung, S. Kim, and **J. Choi**, *High speed navigation of a mobile robot based on experiences*, in Proceedings of the 2006 JSME Annual Conference on Robotics and Mechatronics, 2006.
- [17] Sanheon Lee, **Jaesik Choi**, and Hyukjae Lee, *A review of detecting and preventing the propagation of worm in early phase*, in technical report, Korean Electronics and Telecommunications Research Institute, March 2004.

Papers in Preparation

- [18] **J. Choi**, Z. Wang, S.-C. Lee, and W. Jeon, *A Spatio-Temporal Pyramid Matching for Video Retrieval*, under review in Computer Vision and Image Understanding (CVIU).
- [19] **J. Choi** and E. Amir, *Lifted Relational Variational Inferences*, (under review).
- [20] **J. Choi** and W. Jeon, S. Lazebnik, and E. Amir, *Learning and Sampling Pyramids*, in preparation.

Teaching Experience

- **Guest Instructor, CS 498-EA: Reasoning in Artificial Intelligence**, University of Illinois Urbana-Champaign, Department of Computer Science, Fall 2011.
 - * Taught inference algorithms with undirected graphical models (or Markov Networks) to advanced undergraduate and graduate students.
 - * Incorporated real-world (econometric) examples into the lecture to engage students.
- **Teaching Assistant, CS 440: Introduction to Artificial Intelligence**, University of Illinois Urbana-Champaign, Department of Computer Science, taught by Eyal Amir, Fall 2006.
 - * Guided students through a semester project, on-road vehicle detection for autonomous cars.
 - * Provided feedback on codes, and gave additional support for students encountering problems.
- **Teaching Assistant, MEC 788: Mobile Robotics**, Korea University, Department of Mechanical Engineering, taught by Woojin Chung, Spring 2005.

Mentoring Experience and Grant Writing

- **Research Mentor**: an undergraduate student.
Since September 2010, I have continued my work [8], and guided the research of an undergraduate student, and **my description of the project won an Research Experiences for Undergraduates (REU) grant from NSF** (the REU started on May 2011, PI: Eyal Amir).

Select Awards and Honors

- **Cognitive Science / Artificial Intelligence Award**, Beckman Institute, University of Illinois, 2009.
- **Graduate Research Fellowship for overseas study**, Korea Research Foundation (KRF) - the Korean NSF, 2005-2007.
- **Korean Government Scholarships for overseas study toward energy engineering**, Ministry of Commerce, Industry and Energy, 2005 (declined)
- *The second place*, mathematics competition, Gyeonggi Province, Korea, 1995.
- *The first place*, programming competition, Gyeonggi Province, Korea, 1993.
- *Ministry of Science and Technology Award*, Korean Programming competition, 1990.

Academic Service

- **Program Committee Member** for
 - **AAAI** National Conference on Artificial Intelligence (*AAAI-12*).
 - **IJCAI** International Joint Conference on Artificial Intelligence (*IJCAI-11*).
- **Reviewer** for
 - **UAI** Uncertainty in Artificial Intelligence (*UAI 2011* and *UAI 2008*).
 - **ICRA** IEEE International Conference on Robotics and Automation (*ICRA2011* and *ICRA2010*).
 - **AAAI** National Conference on Artificial Intelligence (*AAAI-10* and *AAAI-08*).
 - **IROS** IEEE/RSJ International Conference on Intelligent Robots and Systems (*IROS2009*, *IROS2007* and *IROS2012*).
 - **ECAI** European Conference on Artificial Intelligence (*ECAI2012*).
 - **JAIR** Journal of Artificial Intelligence Research.
 - Computational Intelligence.
 - Mechatronics.
- **Professional organizations:**
 - **IEEE** Institute of Electrical and Electronics Engineers.
 - **AAAI** Association for the Advancement of Artificial Intelligence.
- **Honor Society:**
 - **Tau Beta Pi** The Engineering Honor Society.

Invited Talks

- **University of Illinois at Urbana-Champaign** on Artificial Intelligence and Information Systems (AIIS) Seminar, *Efficient Lifted Inference with Large-Scale Graphical Models*, March 2012.
- **IJCAI-11 Tutorial** on Lifted Inference in Probabilistic Logical Models, *Lifted Inference with Continuous Variables*, July 2011 (Presented by a coauthor).
- **SRI International**, *Lifted Inference for Relational Continuous Models*, June 2011.
- **ICAPS 2010 Workshop** on Combining Action and Motion Planning, *Combining Planning and Motion Planning*, May 2010 (Presented by a coauthor).

Industry Experience

- **Somansa Co., LTD.** Team lead and Lead programmer. *Led a team of 5 software engineers to develop a web traffic monitoring system for high-traffic networks like Google Analytics, processed 0.7B pageviews per day (as of 2003) in realtime* for a top 5 portal site in Korea. 2000–2003

Technical Skills

Programming Languages

- Matlab, C, C++, Perl, JAVA, Hadoop, ASP, CGI, and SQL among others.

References

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