

PARAG SINGLA

Assistant Professor

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EMPLOYMENT

- **Assistant Professor**
Department of Computer Science and Engineering
Indian Institute of Technology Delhi
New Delhi, India.
Period: December 2011 - *Current*
- **Post-doctoral Research Fellow**
Department of Computer Science
University of Texas at Austin
Austin, Texas, USA.
Period: January 2010 - September 2011

EDUCATION

- **Doctor of Philosophy**
Department of Computer Science & Engineering
University of Washington, Seattle, WA
Thesis: Markov Logic: Theory, Algorithms and Applications
Graduation: March 2009
- **Master of Science**
Department of Computer Science & Engineering
University of Washington, Seattle, WA
Thesis: Collective Record Linkage
Graduation: June 2004
- **Bachelor of Technology**
Department of Computer Science & Engineering
Indian Institute of Technology Bombay, India
Thesis: Keyword Search In Databases
Graduation: August 2002

RESEARCH INTERESTS

Statistical Relational Learning (SRL), Machine Learning, Lifted Inference.

PUBLICATIONS

- Dinesh Khandelwal, Kush Bhatia, Chetan Arora and Parag Singla. Lazy Generic Cuts. *CVIU Special Issue on Inference and Learning of Graphical Models, 2015*. Publisher: Elsevier.
- Siddharth Bora, Harvineet Singh, Anirban Sen, Amitabha Bagchi and Parag Singla. On the Role of Conductance, Geography and Topology in Predicting Hashtag Virality. *Social Network Analysis and Mining, Vol 5(1):57, 2015*. Publisher: Springer.
- Happy Mittal, Anuj Mahajan, Vibhav Gogate and Parag Singla. Lifted Inference Rules with Constraints. *NIPS-15 (To appear)*.

- Timothy Kopp, Parag Singla and Henry Kautz. Lifted Symmetry Detection and Breaking for MAP Inference. *NIPS-15 (To appear)*.
- Somdeb Sarkhel, Parag Singla and Vibhav Gogate. Fast Lifted MAP Inference via Partitioning. *NIPS-15 (To appear)*.
- Ankit Anand, Aditya Grover, Mausam and Parag Singla. ASAP-UCT: Abstraction of State-Action Pairs in UCT. *IJCAI-15 (1509-1515)*.
- Somdeb Sarkhel, Deepak Venugopal, Vibhav Gogate and Parag Singla. An Integer Polynomial Programming based Framework for Lifted MAP Inference. *NIPS-14 (3302-3310)*.
- Parag Singla, Aniruddh Nath and Pedro Domingos. Approximate Lifting Techniques for Belief Propagation. *AAAI-14 (2497-2504)*.
- Somdeb Sarkhel, Deepak Venugopal, Parag Singla and Vibhav Gogate. Lifted MAP Inference for Markov Logic Networks. *AISTATS-14 (859-867)*.
- Sindhu Raghavan, Parag Singla and Raymond J. Mooney. Plan Recognition using Statistical Relational Models. In *Plan, Activity and Intent Recognition: Theory and Practice*. Edited by G. Sukthankar, C. Geib, H.H.Bui, D. Pynadath and R.P. Goldman (pp. 57 - 85), 2014.
- Mona Gupta, Happy Mittal, Parag Singla and Amitabha Bagchi. Characterizing Comparison Shopping Behavior: A Case Study. *Workshop on Big Data Customer Analytics (BDCA), 2014 (Co-located with ICDE-14)*.
- Yamuna Prasad, K.K. Biswas and Parag Singla. Feature Selection using One Class SVM: A New Perspective (Poster Paper). *NIPS-13 Workshop on Machine Learning in Computational Biology*.
- Yamuna Prasad, K.K. Biswas and Parag Singla. Scaling-up Quadratic Programming Based Feature Selection (Short Paper). *Late-breaking Track at AAAI-13*.
- Parag Singla. Markov Logic: Theory, Algorithms and Applications (Tutorial Paper). *COMAD-12*.
- Tivadar Papai, Parag Singla and Henry Kautz. Constraint Propagation for Efficient Inference in Markov Logic. *CP-11 (pp. 691 - 705)*.
- Parag Singla and Raymond J. Mooney. Abductive Markov Logic for Plan Recognition. *AAAI-11 (pp. 1069 - 1075)*.
- Pedro Domingos, Daniel Lowd, Stanley Kok, Hoifung Poon, Matthew Richardson and Parag Singla. Markov Logic: A Language and Algorithms for Link Mining. In *Link Mining: Models, Algorithms and Applications*. Edited by P. Yu, C. Faloutsos and J. Han (pp. 135 - 162), 2010.
- Parag Singla, Aniruddh Nath and Pedro Domingos. Approximate Lifted Belief Propagation. *AAAI-10 Workshop on Statistical Relational AI (pp. 92 - 97)*.
- Parag Singla. Markov Logic: Theory, Algorithms and Applications. *PhD Dissertation, University of Washington, Seattle, 2009*.
- Parag Singla and Pedro Domingos. Lifted First-Order Belief Propagation. *AAAI-08 (pp. 1094 - 1099)*.
- Parag Singla and Matthew Richardson. Yes, There is a Correlation - From Social Networks to Personal Behavior on the Web. *WWW-08 (pp. 1 - 7)*.
- Pedro Domingos, Stanley Kok, Daniel Lowd, Hoifung Poon, Matthew Richardson and Parag Singla. Markov Logic. In *Probabilistic Inference and Logic Programming*. Edited by L. De Raedt, P. Frasconi, K. Kersting and S. Muggleton (pp. 92 - 117), 2008.
- Pedro Domingos, Daniel Lowd, Stanley Kok, Hoifung Poon, Matthew Richardson and Parag Singla. Just Add Weights: Markov Logic for the Semantic Web. In *Uncertain Reasoning for the Semantic Web I*. Edited by P. C. G. Costa, C. d'Amato, N. Fanizzi, K. B. Laskey, K. J. Laskey, T. Lukasiewicz, M. Nickles, and M. Pool (pp. 1 - 25), 2008.

- Parag Singla and Pedro Domingos. Markov Logic in Infinite Domains. *UAI-07* (pp. 368 - 375).
- Parag Singla and Pedro Domingos. Entity Resolution with Markov Logic. *ICDM-06* (pp. 572 - 582).
- Parag Singla and Pedro Domingos. Memory-Efficient Inference in Relational Domains. *AAAI-06* (pp. 488 - 493).
- Pedro Domingos, Stanley Kok, Hoifung Poon, Matthew Richardson and Parag Singla. Unifying Logical and Statistical AI. *AAAI-06* (pp. 2 - 7).
- Parag Singla and Pedro Domingos. Discriminative Training of Markov Logic Networks. *AAAI-05* (pp. 868 - 873).
- Parag Singla and Pedro Domingos. Object Identification with Attribute-Mediated Dependences. *PKDD-05* (pp. 297 - 308). **Winner of the Best Paper Award.**
- Parag and Pedro Domingos. Multi-Relational Record Linkage. *KDD-2004 Workshop on Multi-Relational Data Mining* (pp. 31 - 48).
- B. Aditya, Soumen Chakrabarti, Rushi Desai, Arvind Hulgeri, Hrishikesh Karambelkar, Rupesh Nasre, Parag and S. Sudarshan. User Interaction in the BANKS System (Demo Paper). *ICDE-03* (pp. 786 - 788).
- B. Aditya, Gaurav Bhalotia, Soumen Chakrabarti, Arvind Hulgeri, Charuta Nakhe, Parag and S. Sudarshan. BANKS: Browsing and Keyword Searching in Relational Databases (Demo Paper). *VLDB-02* (pp. 1083 - 1086).

PRIOR RESEARCH EXPERIENCE

- **University of Texas, Austin** **Jan 10 - Sep 11**
 Position: Post-doctoral Research Fellow
 Projects:
 - Online learning with partial observability in SRL models
 - SRL models for abductive inference
 - Constraint propagation for inference in SRL models
- **University of Washington, Seattle** **Jan 04 - Dec 08**
 Position: Research Assistant
 Projects:
 - Algorithms for efficient learning and inference in Markov logic
 - Extending the semantics of Markov logic to infinite domains
 - Application of Markov logic to entity resolution
 - Object-Identification using collective information
- **Kodak Research Labs, Rochester, NY.** **Jun 07 - Aug 07**
 Position: Summer Intern.
 Project: Discovering social relationships from personal photo collections using Markov logic.
- **Microsoft Research, Redmond, WA.** **Jul 06 - Sep 06**
 Position: Summer Intern.
 Project: Finding a correlation between the personal behavior of people on the web (i.e. keyword searches, demographics etc.) and their social behavior (i.e. talking characteristics on IM).
- **IIT Bombay, Mumbai** **Jul 01 - Aug 02**
 Position: Undergraduate Researcher.
 Project: Supporting web like keyword search in databases.

- **IBM India Research Lab, New Delhi, India.** **May 01 - Jul 01**
Position: Summer Intern.
Project: Agglomerative clustering of a set of proper nouns using the features extracted from the web.

TEACHING EXPERIENCE AND ACTIVITIES

Courses Proposed, IIT Delhi.

- Undergraduate Course on “Fundamentals of Machine Learning” (CSL 341) (Along with other Faculty in the CSE Department). Approved by the IIT Delhi Senate, 2012.

Instructor, IIT Delhi.

- COL 776: Learning Probabilistic Graphical Models **Ongoing**
- COL 774: Machine Learning **Spring 15**
- CSL 341: Fundamentals of Machine Learning **Spring 14**
- CSL 100: Introduction to Computer Science **Summer 14**
- CSL 864: Special Topics in AI: Probabilistic Graphical Models **Spring 14**
- CSL 341: Fundamentals of Machine Learning **Fall 13**
- CSL 102: Introduction to Computers and Programming (co-instructor with Huzur Saran) **Spring 13**
- CSL 865: Special Topics in Computer Applications: Machine Learning **Fall 12**
- CSL 102: Introduction to Computer Science (co-instructor with Huzur Saran) **Spring 12**

Teaching Assistant, University of Washington, Seattle.

- CSE P546: Data Mining (Professional Masters) **Fall 04, Spring 03**
- CSE 531: Computability and Complexity (Graduate) **Fall 03**
- CSE 142/143: Computer Programming (Undergraduate) **Winter 03, Fall 02**

TUTORIALS AND INVITED TALKS

Tutorials:

- Markov Logic: Theory, Algorithms and Applications. COMAD 2012, Pune.

Invited Talks:

- Guavus (India) - Research and Development, Gurgaon, 2014.
- Guavus (India) - Research and Development, Gurgaon, 2014.
- Indian Institute of Technology Madras, 2013.
- Tata Consultancy Services, Gurgaon, 2013.
- Workshop on Social Computing, IIT Kharagpur, 2012.
- Mysore Workshop on Machine Learning, Mysore, 2012.
- TACTIC's Conference, Tata Consultancy Services, Delhi, 2012.
- Indian Institute of Science, Bangalore, 2011.
- eBay, San Jose, 2011.
- Undergraduate AI class, UT Austin, 2010.

- Microsoft Research Redmond, 2008.
- IBM India Research Lab, Bangalore, 2008.
- Indian Institute of Technology Bombay, 2008.

PATENTS AND SOFTWARE

Patents:

- Matthew Richardson and Parag Singla. Using Joint Communication and Search Data. Microsoft Corporation, Issued April 2012.
- Jiebo Luo, Parag Singla, Henry Kautz and Andrew Gallagher. Discovering Social Relationships in Consumer Photo Collections. Eastman Kodak Company, Issued May 2011.

Software Developed:

- Alchemy: System for Statistical Relational AI.
<http://alchemy.cs.washington.edu>.
 (Along with various other contributors.)

PROFESSIONAL ACTIVITIES

- Senior Program Committee Member IJCAI 11
- Program Committee Member for AAAI 15, CoDS (IKDD) 15, KDD 14, CoDS (IKDD) 14, IJCAI 13, AAAI 13, ECAI 12, AAAI 12, PGAI @ AAAI 11.
- Reviewer for
 - Journal of Artificial Intelligence Research
 - IEEE Transactions on Multimedia
 - The Computer Journal
 - Information Systems Research
 - ACM Transactions on Knowledge Discovery from Data
 - Annals of Mathematics and Artificial Intelligence

ACADEMIC ACHIEVEMENTS

- PhD Thesis nominated by the University of Washington CSE Department for the ACM SIGKDD Dissertation Award. **2009**
- Winner of the Student Travel Award at ICDM-06. **2006**
- Winner of the Best Paper Award at PKDD-05. **2005**
- In the Joint Entrance Examination for securing admission to the IIT, was placed **Ninety Nine** in India among approximately 100,000 competitive students who took the examination. **1998**
- Recipient of Merit Certificate under National Scholarship Scheme for CBSE (Central Board for Secondary Education) Grade Twelve Examination, India. **1998**
- Ranked **1st** in the whole District for the High School (Grade Ten) Examination, India. **1996**

EXTRA CURRICULAR ACTIVITIES

- Volunteer for Engineering Open House, University of Washington. **2007**

- Coordinator, Group for Rural Activities, IIT Bombay.
- Recipient of the Organizational Color, IIT Bombay.

2001 - 2002

2002

REFERENCES

- **Pedro Domingos**
Department of Computer Science & Engineering,
University of Washington, Seattle, WA.
pedrod@cs.washington.edu
 - **Raymond J. Mooney**
Department of Computer Science,
University of Texas, Austin, TX.
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 - **Henry Kautz**
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University of Rochester, Rochester, NY.
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