Sahil Garg

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Research Interest At large, I am interested in data driven modeling of real world complex systems. This has enabled me, in the past, to extend my knowledge in research domains such as machine learning, network science, natural language processing, robotics, environmental phenomena, Cancerous bio-pathways.

Education

University of Southern California (USC) Aug 2013 - Dec 2018 (expected)
PhD Student in Computer Science Advisor: Aram Galstyan, GPA: 3.81/4

Thapar Institute of Engineering and Technology July 2005 - July 2009
Bachelor of Engineering in Computer Science Major GPA: 8.5/10

Research Experience

University of Southern California (USC)
Mar 2014 - present Advisor: Aram Galstyan
Modeling real-world complex systems especially in relevance to Cancer disease. Involved in problems such as i) semantic parsing (abstract meaning representation); ii) bio-information extraction (graph kernels, Gaussian processes, support vector machines, LASSO, information theory, semantic embedding of edge labels, linear algebra); iii) brain fMRI dynamics modeling (mutual information, optimization, latent variable models); iv) phase transition in community detection (expectation maximization, belief propagation, information theory, stochastic block modeling, network science); v) joint modeling of network structural properties like clustering, power law degree distribution, degree correlation (hierarchical latent space models, embedding in hyperspace, mixed member stochastic block modeling, stochastic variational Bayes, causal inference).

Oct 2013 - April 2014 Advisor: Nora Ayanian
Persistent sensing of environmental phenomena with a team of robotic sensors. This project involved sub-problems such as i) coordinated path planning for multiple mobile sensors in a decentralized manner (velocity obstacles, information theory, greedy algorithms, path planning, mixture models); ii) adaptive modeling of environmental phenomena (Gaussian process, MCMC sampling, particle filtering).

June 2013 - Sept 2013 Advisor: Milind Tambe
Developing scalable game theoretic algorithms for securing natural resources. Protecting fish in the gulf of Mexico by developing guarding strategies as per a Stackelberg game formalism (partially observable Markov decision processes, Monte Carlo tree search, greedy algorithms).

IIIT Delhi
April 2011 - May 2013 Advisor: Amarjeet Singh
Learning non-stationary models efficiently for sensing environment dynamics. This project involved non-stationary spatio-temporal modeling of environmental phenomena for an improved sensing and corresponding learning of the models (convolving of kernels for nonstationarity, non-separable spatio-temporal covariance, latent space modeling, information theory).

Teaching Experience

University of Southern California (USC)
Coordinated Mobile Robotics, Spring 2014 Teaching Advisor: Nora Ayanian

Publications

Conference Proceedings

Extracting Biopathway Interactions using Semantic Parsing of Biomedical Text. Sahil Garg*, Aram Galstyan, Ulf Hermjakob, Daniel Marcu. To Appear in Proceedings of the Thirtieth *AAAI* Conference on Artificial Intelligence, 2016.

Persistent Monitoring of Stochastic Spatio-temporal Phenomena with a Small Team of Robots. Sahil Garg*, Nora Ayanian. Proceedings of Robotics: Science and Systems X, Berkeley, CA, July 2014.

Learning Nonstationary Space-Time Models for Environmental Monitoring. Sahil Garg*, Amarjeet Singh, and Fabio Ramos. Proceedings of the Twenty-Sixth *AAAI* Conference on Artificial Intelligence, 2012.

Workshop Proceedings

Efficient Space-Time Modeling for Informative Sensing. *Sahil Garg**, Amarjeet Singh, and Fabio Ramos. Proceedings of the 6th International Workshop on Knowledge Discovery from Sensor Data, a workshop of *KDD'12*.

Industrial Experience

Snowpal Software Services — Co-founder
June 2010 - Dec 2011 — Manager: Krish Palaniappan
Developed a server side application in education domain including database design and a RESTful API.
Contributions: requirement analysis, database design, architecture design on component level, product development, team recruitment & training.
Technology: Ruby on Rails 3, My SQL 5

Commdel, India — Software Engineer
Aug 2009 - June 2010 — Manager: Srinivasareddy Chennareddy
Developed a component to parse a binary data packet, as per configurable ISO8583 format, into a business object for financial transactions. The extended component was awarded as the best loyalty program in India, and processes transactions worth more than $1.2b yearly.
Contributions: database design, architecture design on component level, product development, client interaction for business understanding, managing production team.
Technology: Java 1.5, Dot Net 3.5, SQL Server 2008

Global Logic, India — Software Intern
Feb 2009 - Aug 2009 — Manager: Atul Srivastava
Developed a component for subscribing RSS feeds in a user friendly manner with an efficient search utility.
Contributions: database design, architecture design on component level.
Technology: Dot Net 3.5, SQL Server 2005

Graduate Coursework

Artificial Intelligence, Database Systems, Coordinated Mobile Robotics, Applied Linear Algebra, Machine Learning, Estimation Theory, Randomized Algorithms (Audit)

Other Skills

Programmed in languages, Python, Matlab, C++, C#, Java, Ruby on Rails, in the past. Also, experience in parallel computing on HPCC/Amazon clusters.

Other educational programs

2015 Complex Systems Summer School, Santa Fe Institute.

Other Accomplishments

- 99% percentile secured in all India entrance exams IIT-JEE-05 (200k participants) and AIEEE-05 (600k participants).
- 1st rank secured in C++ skill exams (for online placements in undergrad school) conducted by companies Informatica Business Solutions (CS batch of 80 students), and Global Logic (220 students).

References

Aram Galstyan galstyan@isi.edu
Research Associate Professor ISI, Univ. of Southern California

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Research Assistant Professor ISI, Univ. of Southern California

Daniel Marcu marcu@isi.edu
Research Associate Professor ISI, Univ. of Southern California

Fabio Ramos fabio.ramos@sydney.edu.au
Associate Professor Univ. of Sydney

Amarjeet Singh amarjeet@iiitd.ac.in
Assistant Professor IIIT Delhi