

Aditya Parameswaran

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Research Interests

Algorithm design and analysis for databases, data mining and the internet.

Education

- **Stanford University** **Stanford, CA**
PhD Program, Computer Science (Recieved MS in Jun. 2010) *Sep. 2007 - Present*
 - Recipient of the Terry Grosz School of Engineering Fellowship
 - Winner of the **Yahoo! Key Scientific Challenges Program 2010**
 - Passed the PhD Comprehensive Exams **in the first attempt** (the only student in my batch to do so)
 - Passed the Infolab PhD Qualifying Exams **in the first attempt**
- **Indian Institute of Technology Bombay** **Mumbai, India**
B.Tech. Computer Science and Engineering *Aug. 2003 - Sep. 2007*
 - Graduated at the **top of my class** of 56 students in the CSE Dept, with a CGPA of 9.63/10.00
 - Awarded the **Institute Silver Medal** and the **Jayati Deshmukh Gold Medal** (2007)
 - Received **perfect GRE and TOEFL Scores** (2006)
 - Awarded the Aditya Birla Scholarship (2003) - A prestigious scholarship **covering the entire undergraduate education expenses** at IIT Bombay

Recent Research Experience

- **Data Cleaning** **Microsoft Research Redmond**
Research Project: Guide: Raghav Kaushik, Arvind Arasu *Summer 2010*

In ongoing work, I am working on a problem related to information extraction in the Data Cleaning project of the DMX group at MSR Redmond.
- **Optimizing Human Computation** **Stanford University**
Research Project: Guide: Profs. H. Garcia-Molina, Jennifer Widom, Alkis Polyzotis *2009-*

I have recently been interested in using human computation (e.g., via Mechanical Turk) in conjunction with traditional database operations and optimizing the computation by minimizing the cost (number of questions asked to humans), reducing uncertainty as well as improving performance. I explored minimizing human computation for a problem of human assisted graph search, which has applications in many domains that can utilize human intelligence, including curation of hierarchies, debugging workflows, image segmentation and categorization, interactive search and filter synthesis.
- **Generalized Recommendations** **Stanford University**
Research Project: Guide: Prof. Hector Garcia-Molina *2008-10*

I have been working on extending recommendation systems to work on domains where there are additional constraints to be satisfied. Specifically, we developed algorithms for recommendations for various prerequisite structures (and proved worst-case bounds), we examined the complexity of general requirement structures and developed recommendations that are not only “good” but also satisfy requirements and lastly, we developed probabilistic techniques for recommendations exploiting temporality in items being consumed. This ongoing research is in the context of the *CourseRank* project in the Infolab.
- **Information Extraction: Extending Wrappers** **Yahoo! Research, Bangalore, India**
Research Internship: Guide: Rajeev Rastogi, Nilesch Dalvi *Winter 2009*

At Yahoo! Research Bangalore (and ongoing), I worked on the problem of developing robust wrappers for information extraction from template based websites. We developed formal frameworks for robustness, and designed and experimented with optimally robust wrappers.
- **Synthesizing View Definitions from Data** **Stanford University**
Research Project: Guide: Profs. Hector Garcia-Molina, Jennifer Widom *2009-10*

I worked on the problem of finding the most succinct and accurate view definition given a database instance and a view instance when the query is restricted to a specific family of queries. We studied the tradeoffs between approximation, succinctness and family of queries. We are now looking to extend this work to assisted query synthesis.

- Concept and Relationship Mining**

Research Internship: Guide: Anand Rajaraman

I worked on the problem of enriching Kosmix's concept taxonomy by discovering new concepts, and attaching them to suitable positions in the taxonomy. We developed algorithms to automatically evaluate and extract concepts from a web corpus using statistical techniques. We also designed techniques to determine relationships between extracted concepts. These techniques were implemented for a dataset of query logs and web documents.

Kosmix Corp., Mountain View

Summer 2008
- Movie Predictions from Blogs**

Research Project

This project dealt with trying to predict movie success using blog mentions. We extracted a comprehensive list of features that deal with movie references in blogs over the past year. We then identified the most useful features for predicting sales (overall, and in future weeks, given blog mentions until previous week) using correlation, clustering and time series techniques, and used these to achieve reasonable success at prediction.

Stanford University

2008 - 09
- Anonymity in Social Networks**

Research Project: Guide: Prof. Balaji Prabhakar

We studied the problem of anonymizing social networks. We developed a new paradigm of anonymization (vertex randomization), and analyzed this theoretically on random graphs. We also analyzed how easy it is for an attacker to gain access to the entire social network graph, given various models of attack.

Stanford University

2008
- Robust 3-D Flow Complex and Visibility**

Research Internship: Guide: Frederic Cazals and Sylvain Pion

Contributed to the theory for the *first efficient and robust implementation* for the Three Dimensional Flow Complex. The Flow Complex is a geometric data structure with applications in surface reconstruction and shape segmentation. I also worked on the problem of visibility in a polygon formed out of circular arcs. We developed some new insights and a general Bentley-Ottman-like sweep algorithm for the same.

INRIA Sophia-Antipolis, France

Summer 2006
- Termination of Linear Programs**

Senior Year Thesis: Guide: Prof Supratik Chakraborty

I studied the problem of termination in my BTech thesis. We developed an algorithm to automatically determine if certain linear programs terminate, without actually executing the program.

IIT Bombay, India

2006 - 07
- Access Control Analysis**

Research Internship: Guide: Prasad Naldurg and Sriram Rajamani

At Microsoft Research, I worked on the problem of using of formal methods to analyze access control permissions to evaluate the security of the Windows XP operating system. We located a number of security criteria based on information flows from authorized users and administrators to ordinary users and methods to check for their violation. Implemented a prototype tool for the same.

Microsoft Research, Bangalore

Winter 2005

Publications and Manuscripts

1. *Answering Queries using Databases, Humans and Algorithms*, Aditya Parameswaran and Neoklis Polyzotis, **Conf. on Innovative Data Management (CIDR)**, Asilomar, USA. Jan 2011
2. *Evaluating, Combining and Generalizing Recommendations with Prerequisites*, Aditya Parameswaran, Hector Garcia-Molina and Jeffrey D. Ullman, **19th International Conf. on Information and Knowledge Management (CIKM)**, Toronto, Canada, Oct 2010
3. *Towards the Web of Concepts: Extracting Concepts from Large Datasets*, Aditya Parameswaran, Hector Garcia-Molina and Anand Rajaraman, **36th International Conf. on Very Large Data Bases (VLDB)**, Singapore, Sep 2010
4. *Recsplorer: Recommendation Algorithms Based on Precedence Mining*, Aditya Parameswaran, Georgia Koutrika, Benjamin Berkovitz and Hector Garcia-Molina, **ACM SIGMOD International Conf. on the Management of Data**, Indianapolis, USA, Jun 2010
5. *Synthesizing View Definitions from Data*, Anish Das Sarma, Aditya Parameswaran, Hector Garcia-Molina and Jennifer Widom, **13th International Conference on Database Theory (ICDT)**, Lausanne, Switzerland, Mar 2010
6. *Human-assisted Graph Search: It's Okay to Ask Questions*, Aditya Parameswaran, Anish Das Sarma, Hector Garcia-Molina, Neoklis Polyzotis and Jennifer Widom, Technical Report, Stanford Infolab, May 2010

7. *Social Sites Research Through CourseRank*, Benjamin Berkovitz, Filip Kaliszan, Georgia Koutrika, Henry Liou, Aditya Parameswaran, Petros Venetis, Zahra Mohammadi Zadeh and Hector Garcia-Molina, Volume 38, **SIGMOD Record**, Dec 2009
8. *Recommendations with Prerequisites*, Aditya Parameswaran and Hector Garcia-Molina (Short Paper) **3rd ACM Conference on Recommender Systems (RecSys)**, New York, USA, Oct 2009
9. *Blogs as Predictors of Movie Success*, Eldar Sadikov, Aditya Parameswaran and Petros Venetis, **AAAI Conf. on Weblogs and Social Media (ICWSM)** May 2009, San Jose
10. *Recommendation Systems with Complex Constraints: A CourseRank Perspective*, Aditya Parameswaran, Petros Venetis and Hector Garcia-Molina, Tech Report, Stanford Infolab, Mar 2009
11. *Anonymization of Social Networks*, Aditya Parameswaran and Ankur Taly, Tech Report, Stanford University, Aug 2008
12. *Robust Construction of the Three-dimensional Flow Complex*, Frederic Cazals, Aditya Parameswaran and Sylvain Pion, **ACM Symposium on Computational Geometry (SOCG)** 2008, Maryland, USA
13. *Termination of Linear Programs*, Aditya Parameswaran, BTech Thesis (Under the supervision of Supratik Chakraborty), June 2007, IIT Bombay
14. *A Vector approach to Ray Tracing for Reflection and Refraction*, Yashodhan Kanoria and Aditya Parameswaran, **Physics Education**, Jan-Mar 2006 issue, Vol 22, No.4

Talks

1. Conference on Information and Knowledge Management (CIKM), Toronto: October 10
2. International Conf. on Very Large Data Bases (VLDB), Singapore: September 10
3. Microsoft Research DMX Group, Redmond, USA: August 10
4. SIGMOD International Conf. on Management of Data, Indianapolis, USA: June 10
5. International Conf. on Database Theory, Lausanne, Switzerland: March 10
6. Yahoo Research Bangalore, India: September 09
7. UC Berkeley, Database Group Lunch Talk: March 09
8. Kosmix Corporation, Mountain View, USA: August 08

Academic Honors and Other Achievements

- IIT - Joint Entrance Examination (2003) - All India Rank of **34** out of nearly 150,000 students.
- National Science Olympiad (2003) - Ranked **4th in India** in this science examination.
- Institute Technical Citation - (2006-07) - Awarded the prestigious **Tech Citation** for excellence in technological extra-curricular activities over the four years at IIT - given to three students each year
- Indian National Physics Olympiad (2003) - Amongst the **top 25** gold medalists in the nation
- Technical Consultant (2007): Worked with the Scriptwriter and Director to **write dialogues for an Indian Film** ('Teen Patti' - released in Feb. 2010) with a budget of the order of tens of Millions of U.S. Dollars
- Member of the Institute Student Mentor body of IIT Bombay (2006): Mentored a group of 16 freshmen
- **Winner of several tech competitions** at IIT Bombay, including Science Journalism (twice), Tech Decathlon, Original Idea Presentation Contest, Yantriki (Robotics Competition)
- Passed Level one of the **Speech and Drama** examination conducted by Trinity College, London, with merit and the Levels 2 and 3 with distinction
- **Trained in singing** in the Carnatic Style (for two years) and in the Hindustani Style (for one year)

Programming Skills

- Languages: Python, C/C++, C#/Java, Scheme, SQL, Haskell, Prolog
- Scripting / Formatting: \LaTeX , HTML, PHP, Awk, Sed, Bash
- Operating Systems: Linux (Ubuntu/Fedora), Windows 98/XP/Vista/7