

Amit Dhurandhar

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Contact

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Research Interests

Machine Learning, Data Mining, Pattern Recognition, Fuzzy Systems, Bioinformatics, Algorithms.

Education

P.h.d. in Computer Science, University of Florida, USA 2006-2009
M.S. in Computer Science, University of Florida, USA 2004-2005
B.E. in Computer Science, Pune University, India 2000-2004
Graduate School GPA: 3.76

Employment

Research Staff Member, IBM T.J. Watson, USA, 2010-present
Postdoctoral Researcher, IBM T.J. Watson, USA, 2009-2010
Research Assistant, University of Florida, USA, 2005-2009

Research and Teaching

IBM T.J. Watson 2009-present

- Performing research in stochastic modeling for applications such as demand forecasting, business compliance analytics.
- Building novel predictive models for complex instrumented domains such as the chip manufacturing industry, petroleum industry, automobile industry, etc.

Research Assistant at UF

2006-2009

- *Machine Learning and Data Mining*: a) Worked with Dr. Alin Dobra on semi-analytical methods for analyzing classification models and model selection measures in the non-asymptotic regime. This included theory and efficient computation using Monte Carlo and non-linear optimization techniques. b) Worked on issues related to collective classification in Statistical Relational Learning. These issues included comparing collective and independent classification and finding distribution free bounds in the relational setting.
- *Fuzzy Systems*: Worked with Dr. Paul Gader on analyzing a generic aggregation function namely, the Choquet Integral.

Teaching Assistant at UF

Fall 2007

- Course: Discrete Mathematics
Responsibilities included lecturing, grading and holding office hours.

Centre for Development of Advanced Computing (C-DAC)

2003-2004

- Developed a proprietary character recognition algorithm for printed Devanagari script documents. Devanagari script has many more characters than the Roman script. Moreover, combination of these characters is also allowed to produce composite characters which makes the problem of efficient and accurate recognition challenging.

Patents

- Pawan Chowdhary, **Amit Dhurandhar**, Markus Ettl, Soumyadip Ghosh, Bruce Graves, Bill Schaefer and Yu Tang. Method and system for optimizing procurement spend compliance. *US Provisional Patent Serial No. 13/339626*.

- Robert Baseman, **Amit Dhurandhar**, Sholom Weiss and Brian White. A System and Method for Continuous Prediction of Expected Chip Performance Throughout the Production Lifecycle. *US Provisional Patent Serial No. 13/242,692*.
- **Amit Dhurandhar**. Improving Predictions using Aggregate Information. *US Provisional Patent Serial No. 13/184,000*.
- **Amit Dhurandhar** and Jayant Kalagnanam. Multistep Time Series Prediction in Complex Instrumented Domains. *US Provisional Patent Serial No. 12/966,465*.

Publications

Journals

- **Amit Dhurandhar** and Alin Dobra. Distribution free bounds for Relational Classification. *Knowledge and Information Systems (KAIS)*, 2011.
- **Amit Dhurandhar** and Alin Dobra. Semi-analytical Method for Analyzing Models and Model Selection Measures based on Moment Analysis. *ACM Transactions on Knowledge Discovery from Data (TKDD)*, Vol. 3, 2009.
- **Amit Dhurandhar** and Alin Dobra. Probabilistic Characterization of Random Decision Trees. *Journal of Machine Learning Research (JMLR)*, Vol. 9, 2008.
- **Amit Dhurandhar** and Alin Dobra. Independent vs Collective Classification in Statistical Relational Learning. submitted
- **Amit Dhurandhar** and Alin Dobra. Probabilistic Characterization of Nearest Neighbor Classifier. submitted
- **Amit Dhurandhar** and Alin Dobra. Test Set Bounds for Relational data that vary with Strength of Dependence. submitted
- **Amit Dhurandhar**. Using Coarse Information for Real Valued Prediction. submitted
- **Amit Dhurandhar**. Bounds on the Moments for an Ensemble of Random Decision Trees. submitted

Conferences/Workshops

- **Amit Dhurandhar**. Improving Predictions using Aggregate Information. *ACM SIGKDD conference on data mining (KDD)*, 2011.
- Pawan Chowdhary, Markus Ettl, **Amit Dhurandhar**, Soumyadip Ghosh, Gopikrishna Maniachari, Bruce Graves, Bill Schaefer and Yu Tang. Identify and Manage Procurement Savings using Advanced Compliance Analytics. *IEEE International Conference on e-Business Engineering (ICEBE)*, 2011.
- **Amit Dhurandhar**. Multistep Time Series Prediction in Complex Instrumented Domains. *Large scale analytics in complex instrumented domains workshop in IEEE International Conference on Data Mining (ICDM)*, 2010. *This paper was also invited to Chance Discovery workshop in (IJCAI)*, 2011.
- **Amit Dhurandhar**. Learning Maximum Lag for Grouped Graphical Granger Models. *Knowledge Discovery from Climate Data Prediction, Extremes, and Impacts workshop in IEEE International Conference on Data Mining (ICDM)*, 2010.
- Robert Baseman, **Amit Dhurandhar**, Michal Ozery and Naama Perush. Statistical Assessment of dissimilarities in trace data of unusual and nominal wafers. *ISMI manufacturing week*, 2010.
- Robert Baseman, Frances Clougherty, **Amit Dhurandhar**, Lyndon Logan, Daniel Poindexter, Brian White, Sholom Weiss, Jonathan Winslow, Denis Zhereschin. Early Predictions of Device Performance for Enhanced Process Control and Operations Optimization. *ISMI Symposium on manufacturing excellence*, 2010.
- John Andrews, Robert Baseman, Michael Biagetti, **Amit Dhurandhar**, Hong Lin, Michal Ozery-Flato, Stuart A Siegel, Naama Parush-Shear-Yashuv, Adam Ticknor. Utilization of Equipment Trace Data in a 300mm Semiconductor Fab. *ISMI Symposium on manufacturing excellence*, 2010.

- **Amit Dhurandhar** and Alin Dobra. Evaluating Evaluation Measures. *Evaluation Methods in Machine Learning workshop in International Conference on Machine Learning (ICML), 2009.*
- **Amit Dhurandhar** and Alin Dobra. Study of Classification Algorithms using Moment Analysis. *New Challenges in Theoretical Machine Learning workshop in Neural Information Processing Systems (NIPS), 2008.*
- **Amit Dhurandhar**, Kartik Shankar and Rakesh Jawale. Robust Pattern Recognition Scheme for Devanagari Script. *IEEE International Conference on Computational Intelligence and Security (CIS) 2005.*

Demos

Dan Connors, **Amit Dhurandhar**, Markus Ettl, Mary Helander, Jayant Kalagnanam, Shubir Kapoor, Ramesh Natarajan, Stuart Seigal, Zhackary Xue. Demand forecasting and supply chain optimization using freshness. *Information on Demand Conference (IOD), 2010.*

Technical Reports

- **Amit Dhurandhar** and Paul Gader. Output Distribution of Choquet Integral.
- **Amit Dhurandhar** and Alin Dobra. Insights into Cross-validation.

Recent Presentations

- Condition Monitoring and Predictive Maintenance, *Workshop with Samsung, 2011.*
- Improving Predictions using Aggregate Information, *KDD, 2011.*
- Multistep Time Series Prediction in Complex Instrumented Domains, *ICDM, 2010.*
- Learning Maximum Lag for Grouped Graphical Granger Models, *ICDM, 2010.*
- Condition based monitoring, *Workshop with Petrobras, 2010.*
- Semi-analytical Method for Analyzing Models and Model Selection Measures, *IBM T.J. Watson Research, 2009.*
- Evaluating Evaluation Measures, *ICML, 2009.*
- Semi-analytical Method for Analyzing Models and Model Selection Measures, *Yahoo Research, 2008.*
- Study of Classification Algorithms using Moment Analysis, *NIPS, 2008.*

Professional Activities

- Have been a reviewer for Knowledge Discovery and Data Mining (KDD), Siam Conference of Data Mining (SDM), Journal of Machine Learning Research (JMLR), IEEE Transactions on Information Theory (IEEE-IT) and ACM Transactions on Knowledge Discovery in Data (TKDD).

Achievements

- Top IBMER award, for winning the 5th Annual IBM Chess Tournament, (researchers from the Deep Blue team also participated) 2011.
- First patent application invention achievement award presented by IBM, 2011.
- 2nd prize in all India project competition, Concepts 2004 sponsored by Microsoft, Cybage, Calsoft and other top companies.
- 2nd prize in all India Robotics competition, Techfest 2003 at IIT Bombay.
- Among the top 10 students out of a total of 12000+ B.E. students at the Pune University, 2001.

Skills

- Proficient in major programming languages and platforms.
- Strong mathematical skills (in particular statistical analysis).
- Fluent in English, Hindi and Marathi.

**Activities and
Leadership**

- Volunteered at Pets Alive no-kill animal shelter.
- Led sessions in the Algorithm Theory Group Meetings in Fall 2008.
- Co-ordinator for the Database Center Weekly Seminars in Spring 2008.
- College team captain of the chess team in undergrad.
- College team member of the badminton team in undergrad.
- Love playing sports viz. Table Tennis, Squash, Swimming and outdoor activities.

References

Will be made available on request.