Parameswaran Raman

Contact Information

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Research Interests

Scalable optimization methods for Machine Learning, Large Scale Bayesian Inference, Recommender Systems

Education

PhD - Computer Science, UC Santa Cruz **Aug 2013 - present**
Thesis Advisor: S.V.N Vishwanathan
(Transferred from **Purdue University (2013 - 2014)**)

Masters - Computer Science, Georgia Institute of Technology **Aug 2009 - May 2011**

MSc (Integrated) - Software Engineering, PSG College of Technology, India **2003 - 2008**

Research Experience

Graduate Research Assistant, UC Santa Cruz **Aug 2013 - present**

- Exploring connections between Factorization Machines, Polynomial Kernels and Deep Neural Networks. This can provide insights and guidelines on how to build distributed data and model parallel algorithms for these models that can handle richer feature representations (higher degrees).
- [**ArXiV**] Extreme Stochastic Variational Inference: Distributed, asynchronous optimization method for scaling up Variational Inference on mixture models to large datasets.
- [**ArXiV**] Exploiting Double Separability for Scaling up Distributed Multinomial Logistic Regression problems to very large number of classes and examples.
- [**Accepted for NIPS 2014**] Proposed a new Learning to Rank algorithm (RoBiRank) inspired by Robust Binary Classification, which directly bounds NDCG. Demonstrated scaling on large datasets.

Applied Scientist Intern - Amazon AI (Palo Alto) **Summer 2017**
(Mentors: Anima Anandkumar, Zack Lipton)
Worked on video recommendation using Deep Neural Networks based models. Part of the work involved exploring use of the new MXNet Gluon framework to build the recommender system.

Research Intern - Adobe Research (STL) **Summer 2016**
(Mentors: Hung Bui, Branislav Kveton)
Worked on clustering user-behavior in Adobe analytics data using user url click information.

Research Intern - Microsoft (Cloud and Information Services Lab) **Summer 2015**
(Mentors: Keerthi Selvaraj, Dhruv Mahajan)
Worked on the problem of extrapolating learning curves in machine learning. The goal was to study if it was feasible to use information from the models learnt on various sizes of small bites of data to extrapolate performance of the algorithm on the full data.

Research Intern - Search Relevance (SNA), LinkedIn **Summer 2014**
(Mentors: Viet Ha-Thuc, Shakti Sinha)
Worked on resolving issues of sample bias and position bias present in learning to rank systems with implicit feedback. Explored a variety of approaches, and ran offline and online experiments on LinkedIn Job Search portal to verify the effectiveness of the models.

Graduate Research Assistant, ITAP - Purdue University **Aug 2013 - Aug 2014**
[**Accepted for EDM 2014**] Applied machine learning on educational mobile & web apps data to infer relevance of user posts to the lecture topics. Results helped improve student engagement in classrooms.

Independent Research, Info Lab, Stanford University **Summer 2012**
Explored the scope of using learning methods in crowd-sourcing systems, to improve label complexity and

quality of judgements among workers. In addition, experimentally analyzed the effects of using various interfaces for categorization of items in a taxonomy, simultaneously trying to model their error rates.

Graduate Research Assistant, Sonification Lab, Georgia Tech **Aug 2009 - May 2011**
[**Work appeared in several demos and accepted for ICAD 2010, CSUN 2010**]
Prototyped tools to demonstrate key ideas that came up in two projects Auditory Menus and In-Vehicle Assistive Technology (IVAT). Used machine learning for driver mood detection & providing alerts.

Research Assistant, Dept of Maths & Computer Applications, PSG Tech **2007 - 2008**
[**Accepted for DCCA Jordan 2007 and PETRA 2008**] Worked with Dr Nadarajan and Dr Maytham Safar to propose effective cache replacement policies for Location-Dependent Data in mobile environments and implement tools for evaluating them.

Industry Experience

Software Engineer, Yahoo!, Sunnyvale **Jul 2011 - Jul 2013**

- Worked for the Personalization group, on an entity detection/resolution system used by all personalization services. Used machine learning and NLP to detect word/phrase boundaries and rank extracted entities. Built a Knowledge Graph from scratch to power Yahoo! search products.
- Worked on the Web of Objects project, to create a semantic knowledge base of entities to enable personalization. Designed features for Entity Matching models and wrote tools to evaluate them.
- Worked on Apache Oozie (a widely used job scheduler for Hadoop), implementing several features and fixing bugs in the system.

Software Engineering Intern, Intel, Chandler **Summer 2010**
Developed a searching & indexing infrastructure to help silicon engineers find relevant product design information. Gathered requirements, developed & tested the system, and deployed in production.

Application Developer, ThoughtWorks, Bangalore **Jun 2008 - Jul 2009**
Designed and implemented web-services for the train ticket retailing system - thetrainline.com. Worked in a fully agile setup following iterative test-driven software development.

Publications & Posters

- Parameswaran Raman, Jiong Zhang, Hsiang-Fu Yu, Shihao Ji, S.V.N Vishwanathan. "**Extreme Stochastic Variational Inference: Distributed and Asynchronous** ," *arXiV* pre-print.
- Parameswaran Raman, Shin Matsushima, Xinhua Zhang, Hyokun Yun, S.V.N Vishwanathan. "**DS-MLR: Exploiting Double Separability for Scaling up Distributed Multinomial Logistic Regression**," *arXiV* pre-print.
- Hyokun Yun, Parameswaran Raman, S.V.N. Vishwanathan. "**Ranking via Robust Binary Classification and Parallel Parameter Estimation in Large-Scale Data**," *NIPS*. 2014.
- Mariheida Córdova Sánchez, Parameswaran Raman, Luo Si, Jason Fish. "**Relevancy Prediction of Micro-blog Questions in an Educational Setting**," in *Proceedings of the 7th International Conference on Educational Data Mining, EDM*. 2014.
- Myounghoon "Philart" Jeon, Benjamin Davison, Jeff Wilson, Parameswaran Raman, Bruce N. Walker. "**Reducing repetitive development tasks in auditory menu displays with the auditory menu library**," in *Proceedings of the 16th International Conference on Auditory Display (ICAD)*. 2010.
- Parameswaran Raman, Narayanan Ramakrishnan, Manohar Ganesan, Gourab Kar, Dr Gregory D. Abowd. "**PiX-C: Express and Communicate (Augmenting Communication with Visual Input for Children in the Autism Spectrum)**," in *Poster presented at the UIST Student Innovation Contest*. 2010.
- Mary Magdalene Jane, Parameswaran Raman, Maytham Safar, Nadarajan R. "**PINE-guided cache replacement policy for location-dependent data in mobile environment**," in *Proceedings of*

the First international conference on Pervasive Technologies Related to Assistive Environments, PETRA. 2008.

Academic Services

- Reviewer for UAI 2014, AISTATS 2015, COLT 2015, JMLR 2015, TPAMI 2015, AISTATS 2016, ICML 2016, NIPS 2018
- Developed and taught an undergrad bootcamp on Unix / Shell commands at UC Santa Cruz
- TA for Machine Learning (Grad Level) course at UC Santa Cruz

Honors/Awards

- Graduate Research Assistantship, UC Santa Cruz
- Graduate Research Assistantship, Georgia Tech
- Winner of Facebook Hackathon 2010 at Georgia Tech & finalist at FB HQ
- Finalist for the poster presentation at UIST Student Innovation Contest 2010

Computer Skills

- C++, Java, Python, Matlab, MPI, MXNet / TensorFlow, Hadoop, Apache Spark, Unix