Contact Information

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Research Interests

I am interested in working on the theoretical aspects of machine learning and network science.

Education

University of Wisconsin-Madison, Madison, WI, USA
Master of Science, Electrical Engineering CGPA: 3.84/4 2017 - 2019

Indian Institute of Technology (IIT) Madras, Chennai, India
Bachelor of Technology (Honours), Electrical Engineering CGPA: 8.72/10 2010 - 2014

Professional Experience

University of Wisconsin-Madison, Madison, WI, USA
Graduate Research Assistant, under Dr. Varun Jog on machine learning theory Summer 2018

Indian Institute of Science (IISc), Bangalore, India
Research Assistant (Machine Learning and Statistics) Aug 2016 - Jul 2017

Samsung R&D Institute, Bangalore, India
Senior Software Engineer (4G/LTE protocol stack development) Aug 2014 - Jul 2016

Deutsche Bank, Mumbai, India
Summer Intern (Statistical Modeling) May 2013 - Jul 2013

Indian Space Research Organization, Sriharikota, India
Summer Intern (Digital System Design) Jun 2012 - Jul 2012

Papers

1. **Pydi, Muni Sreenivas**, Varun Jog, and Po-Ling Loh."Graph-Based Ascent Algorithms for Function Maximization." Communication, Control, and Computing (Allerton), 2018 56th Annual Allerton Conference on. IEEE, 2018.
2. **Pydi, Muni Sreenivas**, and Ambedkar Dukkipati. "On Consistency of Compressive Spectral Clustering." 2018 IEEE International Symposium on Information Theory (ISIT). IEEE, 2018.
3. Nagasubramanian, Karthik, and **Muni Sreenivas Pydi**. "Random access retransmission scheme for power limited nodes." Communications (NCC), 2017 Twenty-third National Conference on. IEEE, 2017.
4. Guha, Ashwin, **Muni Sreenivas Pydi**, Biswajit Paria, and Ambedkar Dukkipati. "Analytic Connectivity in General Hypergraphs." arXiv preprint arXiv:1701.04548 (2017).

Technical Skills

Scientific Computing - Python (numpy, scipy, sklearn, TensorFlow), MATLAB, R
General-purpose Programming & Others - C, Java, Excel VBA, LaTeX, HTML

Coursework

UW Madison	**IIT Madras**
CS 838 Large Scale Machine Learning & Optimization	Adaptive Signal Processing
CS 861 Theoretical Machine Learning	Data Structures & Algorithms
CS 761 Mathematical Machine Learning	Control Engineering
MATH 833 Modern Discrete Probability	Probability & Stochastic Processes
ECE 901: Robustness Theory	Operations Research
ECE 729 Information Theory	Computational Neuroscience

Projects

Adversarial Attacks for Kernel Methods in Machine Learning

UW-Madison (Adviser: Dr. Varun Jog) May 2018 - Jul 2018

Designed adversarial attack algorithms that can 'fool' classification algorithms built using kernel SVMs by adding a tiny, imperceptible perturbation to the training images.

Active Learning with Importance Sampling

UW-Madison (Course: Theoretical Machine Learning) Mar 2018 - May 2018

Proposed a probabilistic querying proceduce for selecting training points in an active learning setting. Proved theoretical guarantees on the performance of the algorithm using measure concentration.

Federated Learning with Importance Sampling

UW-Madison (Course: Large-Scale Machine Learning) Mar 2018 - May 2018

Explored the use of importance sampling (in theory and practice) for federated learning, a distributed optimization framework with unbalanced and non-i.i.d data.

Graph-Based Ascent Algorithms for Function Maximization

UW-Madison (Advisers: Dr. Po-Ling Loh, Dr. Varun Jog) Sep 2017 - Feb 2018

Proposed local, iterative random walk algorithms based on the Metropolis-Hastings method, for finding nodes in the graph with a high function value. Proved convergence and high probability hitting time bounds for the proposed algorithms. *Link*

Contextual Bandits in Spectral Representation

UW-Madison (Course: Mathematical Machine Learning) Sep 2017 - Dec 2017

Proposed an algorithm for content recommendation on social networks under an exploration-exploitation ("bandit") framework, using "spectral" features of the users and content derived from graph data.

Spectral Methods for Machine Learning

Statistics & Machine Learning Lab, IISc (Guide: Dr. Ambedkar Dukkipati) Aug 2016 - Jul 2017

- Spectral Clustering: Proved the weak consistency of a compressive spectral clustering algorithm over the stochastic block model, using concentration inequalities. *Link*
- Hypergraph Partitioning: Proved a Cheeger-type bound on the analytical connectivity of non-uniform hypergraphs. *Link*

Machine Learning for Underwater Object Classification

IISc & Defence Research & Development Organization (DRDO), India Sep 2016 - Mar 2017

Implemented machine learning algorithms such as SVMs and deep learning (Neural Networks with Autoencoders and Deep Belief Nets) for classifying underwater objects using passive sonar signals.

LTE eNodeB MAC Log Analyser

Samsung R&D Jan 2015 - Apr 2015

Designed and developed a Python based parsing tool from the ground up, to analyse the LTE eNodeB schedule logs. Received a Spot Award for the outstanding contribution.

Stochastic Mortality Modeling for Actuarial Risk Prediction

Deutsche Bank (Summer Intern) May 2013 - Jul 2013

Developed stochastic models for life expectancy forecasting using time series methods including ARIMA and regression. Developed a longevity index option pricing model in R.

Honours and Achievements

IEEE International Symposium on Information Theory (ISIT) Student Travel Award, 2018.

Jury Award, Samsung R&D, for the best poster at Samsung R&D Tech Fair, 2015.

Achieved Advanced-level Software Competency Certification at Samsung R&D.

Spot Award, Samsung R&D, for outstanding contribution towards the project, 2015.

Conferral of the Honours degree in EE, IIT Madras, 2014 (Requires 12 credits worth of additional graduate coursework and a consistent GPA above 8.5).

CBSE Merit Scholarship, Central Board of Secondary Education (CBSE) India, for 4 years of undergraduate study, 2010-2014.

Institute Merit Certificate, IIT Madras, for being among the top 5% admitted, 2010.

Ranked All India 243 out of 470,000 candidates in IIT Joint Entrance Exam, 2010.

Ranked All India 70 out of a million candidates in All India Engineering Entrance Exam, 2010.

Talks, Posters & Workshops

Gave a talk on Spectral Clustering at the Summer SILO (Systems, Information, Learning & Optimization) Seminar Series 2018, at UW-Madison.

Participating in a semester-long seminar series exploring the connections between VC-dimension and the NIP property in Model Theory, conducted by Prof. Joris Roos in Math Dept., UW-Madison.

Presented a poster at the Midwest Machine Learning Symposium (MMLS), 2018 held at UChicago.

Participated in the TRIPODS Madison Summer School 2018 on the Fundamentals of Data Analysis.

Presented my paper at the IEEE Int'l Symposium on Info Theory (ISIT) 2018 at Vail, CO.

Presented my paper at the National Conference on Communications (NCC) 2018 at IIT Madras.

Teaching Experience

Department of Computer Science, UW-Madison

Head Teaching Assistant, CS 761: Mathematical Foundations of Machine Learning — Fall 2018

Department of Mathematics, UW-Madison

Teaching Assistant, CS/MATH 240: Introduction to Discrete Mathematics — Spring 2018

Teaching Assistant, MATH 171: Calculus with Algebra and Trigonometry I — Fall 2017

Extracurricular Activities

IEEE Student Member

IEEE Information Theory Society Student Member

Volunteered for the IIT Madras Student Satellite Project, Robotics Club and Center for Innovation.

Amassed 1.3 million views on Quora (a Q&A website) for my writing on machine learning, math and sciences for the layman.

Managed a team of 30 and successfully cleared the ISO 9001:2008 Audit at college cultural festival.

Test Scores

GRE - 330/340: 170/170 (Quantitative), 160/170 (Verbal), 4.0/6.0 (Analytical Writing)
TOEFL - 117/120: 30/30 (Reading), 30/30 (Listening), 28/30 (Speaking), 29/30 (Writing)