Aditya Modi

Curriculum Vitae

Overview

My research interests lie in machine learning and optimization. Specifically, I'm interested in theoretical underpinnings of interactive learning and sequential decision making frameworks like reinforcement learning, bandits and active learning.

Education

2016-Present **PhD, Computer Science and Engineering**, *University of Michigan*, Ann Arbor, *GPA – 4.0/4.0*.
Advisors: Satinder Singh and Ambuj Tewari

2012-2016 **Bachelor of Technology**, *Indian Institute of Technology*, Kanpur, *GPA – 9.4/10.0*.
Major: Computer Science

Publications/Preprints

ALT 2018 **Markov Decision Processes with Continuous Side Information**.
Aditya Modi, Nan Jiang, Satinder Singh, Ambuj Tewari [link]
Accepted at *International Conference on Algorithmic Learning Theory (ALT) 2018*

Research Experience

Sept-Dec 2016 **Research Assistant**, *University of Michigan*, Ann Arbor.
Data-dependent Importance weighted Active Learning
Advisors: Ambuj Tewari and Barzan Mozafari

We explored the direction of importance-weighted active learning (IWAL) algorithms based on data-dependent complexity measures for bounded loss functions. We identified key issues in symmetrization and other approaches for the analysis of IWAL for hypothesis classes with bounded VC dimension. Our preliminary results for the analysis were based upon a sample based cover argument motivated by the VE algorithm in contextual bandits literature.

May-July 2015 **Research Intern**, *Microsoft Research*, Bangalore, India.
Active Semi-supervised Performance Evaluation
Advisor: Sundararajan Sellamanickam, Principal Applied Scientist. [Report]

Our work develops an estimation method for performance measures of black-box classifiers in a scarcely labelled data setting. We proposed a semi-supervised density estimation method for class-score estimation based on entropy regularization. Experiments were undertaken on various non-decomposable performance measures (ROC curve, PR curve, F-measure) with varying proportion of labelled examples. Finally, a comparison is also pulled out between existing approaches and our work.

Selected Projects

Sept-Dec 2015 **Local Latent Perceptrons for Large Scale Multiclass Learning**.
Research Project under Vinay Namboodiri, IIT Kanpur
We formulated a latent perceptron model inspired from Locally Linear SVM (LLSVM) and a mixture of experts model. [Preliminary Report]

BBB, 2260 Hayward St. – Ann Arbor, Michigan - 48105
(734) 881 0810 • admodi@umich.edu • adityamodi.github.io

Feb-Apr 2016 **Active optimization of ranking surrogates**.
Course Project under Purushottam Kar, IIT Kanpur
Combined a selective sampling scheme with online algorithms for optimizing precision@k measure for bipartite ranking. [Report]

Feb-Apr 2016 **Stochastic methods for MCMC**.
Course Project under Piyush Rai, IIT Kanpur
Explored variance reduction techniques in stochastic optimization for stochastic gradient Langevin dynamics (SGLD) method. [Report]

Nov-Dec 2016 **Asynchronicity and delay in distributed stochastic optimization**.
Course Project under Long Nguyen, University of Michigan
Investigated the delay tolerance of stochastic optimization methods based on recent advances in the literature. [Report]

Awards and Achievements

May 2016 Travel Scholarship for MLSS Cadiz, 2016.

2014-15 Academic Excellence Award, IIT Kanpur.

2014 Ram Parkash Chopra Memorial Scholarship, given for academic excellence.

2013 OP Jindal Engineering and Management Scholarship, given to around 100 students from top engineering and management institutes from India.

2012-13 Academic Excellence Award, IIT Kanpur.

2012 Secured All India Rank 132 in IIT-JEE 2012 out of 0.5 million candidates.

2012 Secured All India Rank 150 in AIEEE 2012 out of 1.2 million candidates.

Teaching experience

Winter 2017 **Graduate Student Instructor**, EECS 445 - Machine Learning, Univ. of Michigan.

Winter 2016 **Student Mentor**, CS 771 - Machine Learning Techniques, IIT Kanpur.

Fall 2015 **Teaching Assistant**, ESO 207 - Data Structures and Algorithms, IIT Kanpur.

Activities

2017 Co-organizer, Statistical Machine Learning Reading group, Univ. of Michigan.

Relevant Coursework

Theory Algorithms - II, Computational Complexity, Algorithmic Game Theory

Statistics Statistical Inference, Probability Theory, Large Sample Theory.

Machine Learning/AI Machine Learning, Learning with Kernels, Online Learning and Optimization, Probabilistic Machine Learning, Optimization Methods in Statistics, Advanced Artificial Intelligence, Applied Game Theory.