

Ajil Jalal

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Education

University of Texas at Austin 2016-Present
Ph.D., Electrical and Computer Engineering GPA: 4.0/4.0
Advisor: Prof. Alexandros G. Dimakis
Interests: Statistical Machine Learning, Information and Coding Theory, Generative Models

Indian Institute of Technology Madras 2012-2016
Bachelor of Technology (Honours) in Electrical Engineering GPA: 9.06/10
Advisors: Prof. Krishna Jagannathan and Prof. Rahul Vaze
Minor: Systems Engineering

Publications

Ashish Bora, **Ajil Jalal**, Eric Price, Alexandros G. Dimakis, "Compressed Sensing Using Generative Models", ICML 2017, Sydney, Australia.

Umang Bhaskar, **Ajil Jalal**, Rahul Vaze, "The Adwords Problem with Strict Capacity Constraints", FSTTCS 2016, Chennai, India.

Professional Experience

Tata Institute of Fundamental Research Mumbai, India
Undergraduate Research Intern Summer 2015
Designed approximation algorithms and showed approximation bounds for an online combinatorial optimization problem.

Audience Communication Systems Bangalore, India
Undergraduate Intern Summer 2014
Worked on a text dependent automatic speaker recognition system.

Audience Communication Systems Bangalore, India
Undergraduate Intern Winter 2013
Worked on reducing power dissipation in MIPS processors by minimising switching activity in the processor.

Projects

Compressed Sensing Using Generative Models August 2016- Present
UT Austin, with Prof. Alexandros G. Dimakis and Prof. Eric Price

- Introduced a new approach to compressed sensing. Traditional compressed sensing tries to find a sparse solution to an under-determined system of linear equations.
- Our approach is to search for an approximate solution in the span of a generative model.
- Proved upper bounds on number of measurements required for recovering a solution with low ℓ_2 error. Empirical results show that we require 10x less measurements than the traditional LASSO algorithm.

The Adwords Problem with Strict Capacity Constraints

May 2015- May 2016

TIFR, with Prof. Rahul Vaze and Prof. Umang Bhaskar

- An adversary produces weighted jobs to a set of servers with finite capacities at discrete time steps, and a matching must be found at each time step. Objective is to maximize the aggregate sum of jobs matched.
- Designed a randomised online algorithm and proved an approximation factor of 6. Designed and proved that a deterministic online algorithm achieves an approximation factor of 3 for a restricted case. Also showed that a load balancing algorithm is near-optimal for a special case.
- Proved lower bounds which show our algorithms are almost tight.

Text Dependent Automatic Speaker Recognition

Summer 2014

Audience Communication Systems, with Murali Deshpande and Vinay N Krishnan

- Implemented an adaptive Gaussian Mixture Model which can be trained to recognise a particular keyphrase by a user. Can be used as part of a voice activated wake up feature for cellphones.
- Model uses approximately 10 seconds of training data per user and achieves 80%+ accuracy.

Honors

- Ranked **535** nationally in the **2012 IITJEE**, among 700,000 competitors.
- **Karnataka Regional Mathematical Olympiad** scholar. Attended the **Indian National Mathematical Olympiad (INMO)** camp and represented Karnataka in the INMO, 2011.
- **Kishore Vaigyanik Protsahan Yojana (KVPY)** fellow, 2012.
- Honorable Mention in **Quantify**, an analytics competition organised by Goldman-Sachs, 2015.
- Nominated for the **INSPIRE** scholarship, awarded to the top 1% in the CBSE grade XII examinations, 2012.
- Ranked **63** in the **Kerala Common Entrance Examination(CEE)**, 2012.

Teaching Experience**University of Texas at Austin:***Teaching Assistant, EE351K: Introduction to Probability and Statistics*

Spring 2017

Teaching Assistant, EE360C: Algorithms

Fall 2016

Skills*Programming languages: Python, C, C++.**Libraries and Toolkits: Tensorflow, Matlab, \LaTeX , Numpy, Scipy.***Relevant Courses**

Machine Learning

Information Theory

Error Control Coding

Convex Optimization Theory and Algorithms

Probability and Stochastic Processes

Approximation Algorithms

Theory of Computation

Adaptive Signal Processing

Digital Communication Systems

Computational Methods in EE

Analog and Digital Signal Processing

Modern Control Theory

Network Analysis

Multivariate Data Analysis

Real Analysis

Complex Analysis

Process Optimization

Reinforcement Learning

Hobbies*Music:* Professionally trained in Tabla and completed Preliminary, First Year and Second Year Examinations. All examinations were conducted by the **Bangiya Sangeet Parishad**.*Other:* Soccer, squash, pencil sketching, watercolor and oil painting.