Yeshwanth Cherapanamjeri

Ph.D Applicant in Machine Learning

Contact Information

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Research Interests

Statistical Learning Theory, Optimization, High Dimensional Statistics

Current Position

Microsoft Research India (June 2015 - Present)
Research Fellow Advisors: Dr. Prateek Jain and Dr. Praneeth Netrapalli

Education

Indian Institute of Technology Bombay (July 2011 - May 2015)
B. Tech with Honors in Computer Science and Engineering
Minor in Applied Statistics and Informatics
CGPA: 9.31

Research Experience

Robust Matrix Completion (June 2015 - May 2016)
Advisor: Dr. Prateek Jain, Microsoft Research India

- Formualated the Robust Matrix Completion as the Non-Convex Optimization problem by expressing the observed matrix as a sum of a low rank and a sparse matrix
- Proposed an efficient algorithm based on Singular Value Projection and Hard Thresholding to solve the problem which is nearly linear in the *dimension* of the matrix
- Showed the proposed algorithm to be optimal in the amount of tolerable corruption and nearly optimal in running time and sample complexities
- Improved the best known results for matrix completion using Non-Convex Optimization
- Empirically evaluated the algorithm on synthetic and real-world foreground-background separation tasks to corroborate theoretical guarantees
- A paper based on this work has been submitted to AISTATS' 17. ArXiv version can be found here

Non Convex Outlier-Robust PCA (June 2016 - Present)
Advisors: Dr. Prateek Jain and Dr. Praneeth Netrapalli, Microsoft Research India

- Formulated Outlier-Robust PCA as the Non-Convex Optimization problem of expressing a matrix as a sum of a low rank and a column-sparse matrix
- Proposed an efficient hard-thresholding based algorithm to solve the proposed problem which is shown to be nearly linear in the number of non-zero entries of the matrix
- Showed the porposed algorithm to be optimal in the fraction of corrupted columns
- Emprically evaluated the proposed algorithm on synthetic and a variety of anomaly detection datasets to corroborate theoretical guarantees

We are currently investigating efficient streaming variants of our algorithm which can be deployed on low resource devices. We are preparing our results for a publication.

Entity Linking with Hierarchical Non-Parametric Topic Models (May 2014 - May 2015)
Advisors: Prof. Ganesh Ramakrishnan and Prof. Soumen Chakrabarti, IIT Bombay

- Worked on the use of non-parametric topic models for entity linking, the task of annotating mention phrases in text to their referents in a knowledge base
- Proposed a novel extension of existing methods to alleviate the issue of No Attachment phrases caused by knowledge base sparsity

- Proposed optimizations to existing Gibbs sampling techniques to scale to large corpora like Wikipedia
- Evaluated the proposed algorithm on corpora constructed from Wikipedia and Yago! to demonstrate performance improvements due to the proposed optimizations

The report can be found `here`.

Contour and Junction Detection in Architectural Images (May 2013 - July 2013)
Advisor: Prof. Marcus Magnor, TU Braunschweig

- Implemented and evaluated the *gPB* algorithm for detecting contours on natural images
- Proposed domain specific extensions to *gPB* to extract junction points based on the extracted contours
- Utilized as part of a user-guided tool to form a 3D reconstructuction of the façade of a building from multiple images A referal letter from the project can be found `here`

Scholastic Achievements

Secured **All India Rank 67** in **IIT-JEE 2011** amongst more than 500,000 candidates

Declared successful at the **Indian National Mathematical Olympiad (INMO)** in 2011 and 2010

Awarded **Kishore Vaigyanik Protsahan Yojana (KVPY) Scholarship** in 2011 with an All India Rank of 13

Selected among the top 1% of students in India in the Indian National Chemistry and Physics Olympiads in 2011

Qualified for the regional rounds of the ACM ICPC in 2013 and 2014

Talks & Seminars

Entity Linking with Hierarchical Non-Parametric Topic Models (Mar 2015)
Advisor: Prof. Ganesh Ramakrishnan, Microsoft Research India & IIT Bombay

Stability and Generalization in Machine Learning (Sep 2014)
Advisor: Prof. Saketha Nath J., IIT Bombay

Hopfield Networks and Applications (Mar 2014)
Advisor: Prof. Pushpak Bhattacharya, IIT Bombay

Contour and Junction Detection in Architectural Images (July 2013)
Advisor: Prof. Marcus Magnor, TU Braunschweig

Professional Service

Reviewer for AAAI 2017: Served as a reviewer for the thirty-first AAAI Conference on Artificial Intelligence

Teaching Assistant for MA 214 - Numerical Analysis: Mentored a group of 30 students part of an introductory course on the analysis of commonly used numerical algorithms in scientific computing

Technical Skills

Programming Languages: C++, Java, Python, Scheme

Numerical Computing: Matlab, Octave, R

Miscellaneous: Spark, LaTeX, Prolog, MySQL

Extra Curriculars

Completed beginner level Mandarin Chinese course offered by IIT Bombay with distinction

Completed one year guitar course offered by the National Sports Organization

Awarded Brown belt in Karate by Kokino Shito-Ryu School of Karate