Aditya Kumar Akash

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Research Interests

Machine Learning, AI, Robotics, Computer Vision

Education

Aug 2016 **Bachelors of Technology with Honors,** *Computer Science and Engineering*, Indian Institute of Technology, Bombay
GPA : $9.18/10$

May 2012 **Senior Secondary Education,** *Delhi Public School*, B.S. City, 97.4%

May 2010 **Matriculation,** *St. Francis School*, Jasidih, 97.85%

Publications

2016, 2017 **Lower bounds for graph exploration using local policies**
A. K. Akash, S. P. Fekete, S.K. Lee, A.Lpez-Ortiz, D. Maftuleac, and J. McLurkin
10th International Workshop on Algorithms and Computations (WALCOM)
Journal of Graph Algorithms and Applications [link]

2015 **Local policies for efficiently patrolling a triangulated region by a robot swarm**
D. Maftuleac, S.K. Lee, S. P. Fekete, A. K. Akash, A.López-Ortiz, and J. McLurkin
IEEE International Conference on Robotics and Automation (ICRA) [link]

Major Research Projects

Autumn 2015 - Spring 2016 **Consensus-based Active Learning Strategy for Multi-Label Classification**
Undergraduate Dissertation, IIT Bombay
Guide: Prof. Ganesh Ramakrishnan

- Worked on problem of multilabel classification for predicting video tags
- The problem involved multiple human and machine labelers, and required transitioning from scarce labelled data start to a warm-start setting
- Designed a novel active learning based strategy that optimizes the cost of labeling, labeler reliability and inter-labeler consensus
- Demonstrated better classification results on real-world datasets with fewer labeled data than state-of-the-art methods [part1][part2]

Spring 2016 **Application of Probabilistic Principal Component Analysis (PPCA)**
Undergraduate Research Project, IIT Bombay
Guide: Prof. Suyash Awate

- Analyzed applications of PPCA for cases in which data vectors exhibit missing values
- Investigated the comparative performance of PPCA against variants of standard PCA for estimating missing data
- Empirically concluded that PPCA would perform better when data has inherent mixture model distribution [report][code]

Summer 2014 **Local counter-based policies for robot patrolling**
Research Internship, Technische Universität, Braunschweig, Germany
Guide: Prof. Sándor P. Fekete

- Worked on theoretical aspects of swarm of mobile robots exploring an arbitrary graph
- Researched in detail LRV (Least Recently Visited) patrolling policies and established a new, previously unknown, lower bound on LRV-vertex policy
- Contributed to aspects of a possible new upper bound using edge based patrolling policies
- The work led to publications in ICRA and WALCOM [paper1][paper2]

Work Experience

July 2016 - Present **Google, Maps Auto-Moderation Team**
Software Engineer, Bangalore

- Working on auto-moderation system which is responsible for moderating millions of user edits on Google maps and preventing spam and graffiti attacks
- Built user consensus and trust models for leveraging user votes to better decide the acceptance of edits on Maps
- Reduced spam risks and improved sensitivity of the graffiti detection model
- Extensively worked with lattice regression based ensemble models

Summer 2015 **Microsoft, Bing Ads Team**
Intern, Bangalore, Guide : Rahul Agrawal

- Worked on problem of predicting CTR (click through rate) for ads on Bing search
- Used metasearch techniques along with mixture models and boosted fast tree regression to combine relevance scores of queries and related keywords obtained from various algorithms
- Implemented the solution on Microsoft's internal big data platform
- This novel approach of predicting CTR showed promising gains in some markets

Seminars

Spring 2015 **Optimal number of hidden layers and nodes**, Introduction to AI
IIT Bombay, Guide: Prof. Pushpak Bhattacharyya [slides]
Discussed about optimal number of hidden layers and nodes in neural networks. Presented a genetic algorithm to find near-optimal solution with minimum network complexity

Autumn 2015 **Lower bound using formulas and rectangles**, Computational Complexity
IIT Bombay, Guide: Prof. Nutan Limaye [slides]
Presented Rychkov's lemma using reduction of lower bound problems on DeMorgan's formula to rectangle covering

Academics

Advanced Courses: Artificial Intelligence, Medical Image Processing, Convex Optimization, Machine Learning, Computational Complexity, Game Theory

Skills: C, C++, Java, Python, MATLAB, LaTeX, numpy-scipy, TensorFlow

Scholastic Achievements

2016 **Winners** in **ACM ICPC** Chennai regionals, qualified for **World Finals**

2013 **Invited by HRD Ministry**, Government of India, to witness Republic Day parade from Prime Minister's box, for academic excellence in senior secondary school

2012 **All India Rank 38** in *IIT JEE*, among 500,000 candidates

2012 **All India Rank 50** in *AIEEE*, among 1.5 million candidates

2010 **KVPY**, National Program of Fellowship in Basic Sciences, awarded by Department of Science and Technology, Government of India

Course Projects

Spring 2016 **Application of Partial Least Squares (PLS) Dimension Reduction**
Guide: Prof. Suyash Awate, [report]
Implemented a regression using PLS dimensionality reduction and used it to obtain better classification results than SVM & PCA based methods on datasets with high dimensionality

Autumn 2015 **Second Order Cone Programming for Robust Least Squares**
Guide: Prof. Ganesh Ramakrishnan, [report]
Implemented Barrier method and Primal Dual Interior Point methods in Python and used it to analyze their convergence on Robust Least Squares problem formulated as SOCP

Spring 2015 **Threading and Scheduling in GeekOS**
Guide: Prof. D. M. Dhamdhere, [report]
Added multilevel and round robin scheduling policy in GeekOS, an experimental OS. Implemented kernel and user level thread creations with deadlock handling

Autumn 2014 **Code Corpus**
Guide: Prof. N. L. Sharda, [report]
Created a corpus for competitive programming problems with sophisticated search options. Added intelligent options for auto suggestion of problems and users to follow

Spring 2013 **SlitherLink Puzzle solver**
Guide: Prof. Amitabh Sanyal, [report]
Developed a solver for SlitherLink puzzle in MIT-Scheme. Implemented a self designed algorithm which used concepts of intelligent backtracking

Summer Project

2013 *Electronics Club, IIT Bombay*, [code]
Built a voice controlled robot for Institute Technical Summer Project. Designed voice processing system using hidden Markov model in MATLAB

Position of Responsibility

2017 Co-hosted an intern at Google
2015 **Teaching Assisant** for Computer Programming and Utilization course.
2013 **Web and Coding Club** Coordinator, IIT Bombay

References

Dr. Rahul Sami
Staff Software Engineer
Google, Bangalore
✉ rsami@google.com

Prof. Ganesh Ramakrishnan
Associate Professor
IIT Bombay
✉ ganesh@cse.iitb.ac.in

Prof. Suyash P. Awate
Associate Professor
IIT Bombay
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Prof. Dr. Sándor P. Fekete
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