Akhilesh Gotmare

Master's Student, Computer Science, EPFL

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Education

École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland
Master's, Computer Science, *Sept '16 - present*
GPA: 5.26/6 (Overall)

Indian Institute of Technology (IIT) Gandhinagar, Gujarat, India
Bachelor of Technology, Electrical Engineering (minor in CSE), *Jun '12 - Apr '16*
GPA: 8.99/10 (Overall)

Preprints and Publications

Gotmare A., Keskar N.S., Xiong C., & Socher R. (2018). Using Mode Connectivity for Loss Landscape Analysis. *Workshop on Modern Trends in Nonconvex Optimization for Machine Learning, ICML 2018, Stockholm, Sweden.* arxiv:1806.06977

Gotmare A., Thomas V., Brea J., & Jaggi M. (2018) Decoupling Backpropagation using Constrained Optimization Methods. *Workshop on Efficient Credit Assignment in Deep Learning and Deep Reinforcement Learning, ICML 2018, Stockholm, Sweden* OpenReview

Langvovoy M., **Gotmare A.**, Jaggi M., & Sra S. (2017). Unsupervised robust nonparametric learning of hidden community properties. pre-print arxiv:1707.03494v1

Gotmare A., Bhattacharjee S. S., Patidar R., & George N. V. (2017). Swarm and evolutionary computing algorithms for system identification and filter design: A comprehensive review. *Swarm and Evolutionary Computation*, 32, 68-84.

Gotmare A., Patidar R., & George N. V. (2015). Nonlinear system identification using a cuckoo search optimized adaptive Hammerstein model. *Expert systems with applications*, 42(5), 2538-2546.

Experience

Deep Learning Research Internship
Supervisor(s): Dr. Nitish Keskar, Dr. Richard Socher
Salesforce Research (Metamind), Palo Alto, US *Apr '18 - present*

- Studied mode connectivity as a tool for neural network loss landscape analysis, intermediate results published at an ICML 2018 workshop
- Building efficient language modelling architectures using attention only (Transformer decoders)

MSc Research Scholarship Program & Semester Project
Supervisor(s): Prof. Martin Jaggi, Dr. Mikhail Langovoy
Machine Learning & Optimization Lab (MLO), EPFL, CH *Sept '16 - Feb '18*

Project on Model Parallel and Distributed Backpropagation

- Studied scalable alternatives to backpropogation for training neural networks
- Implemented and compared algorithms inspired by the alternating direction method of multipliers (ADMM) for neural network training with benchmark techniques like adam, sgd with momentum
- Currently working on ADMM inspired model parallel approaches to deep learning | Slides

Project on Robust Learning of Hidden Network Properties

- Designed and implemented experiments on real and artificial datasets to verify the performance of a novel network scanning algorithm that reveals characteristics of hidden communities
- Contributed to documenting the findings and experimental setup | Link to Manuscript

Research Experience for Undergraduates (REU) Internship Program
Supervisor(s): Prof. Nitesh Chawla
Dept. of Computer Science and Engg., University of Notre Dame *May '15 - July '15*

- Studied the performance of deep learning techniques for the classification of real world imbalanced datasets for driving applications in healthcare
- Studied data pre-processing techniques like synthetic minority oversampling or SMOTE, undersampling and Tomek-links reduction and their impact on classification performance with neural network models

Summer Research Internship Program
Supervisor(s): Prof. Nithin V. George
Dept. of Electrical Engineering, IIT Gandhinagar *May '14 - July '14*

Project on Review of applications of evolutionary optimization to system identification and filter design

- Performed an exhaustive review of research articles in the areas of system identification and adaptive filter design using evolutionary optimization algorithms
- Compared and documented the strengths, similarities and differences of the various proposed methods, review article published in an international peer-reviewed journal | Link to Published Article

Project on Nonlinear system identification using evolutionary optimizations strategies

- Developed and implemented a non-linear system identification scheme using Hammerstein models and the Cuckoo Search optimization algorithm | Link to Published Article
- Obtained superior performance in terms of mean squared error (mse) compared to other genetic algorithms, paper published in an international peer-reviewed journal

Relevant Coursework

Undergraduate	**Graduate**
Operating Systems	Machine Learning
Algorithms	Advanced Algorithms
Computational Photography	Applied Data Analysis
Algorithms for Data Science	Convex Optimization
Data Management	Distributed Algorithms
Digital Signal Processing	Mathematics of Data

Course Projects

Recommender system using collaborative filtering techniques	Machine Learning
Analysis of Amazon reviews for Swiss products	Applied Data Analysis
Studying the multiplicative weight updates for solving linear programs	Convex Optimization
Prototype designing of a DBMS for the placement cell at IIT Gandhinagar	Data Management

Talks

Optimization for Deep Learning at Metamind, Apr 2018 | Slides
ADMM inspired neural network training at MLO, EPFL, Oct 2017 | Slides
WTA hashing for large scale computer vision applications at IIT GN, Apr 2016 | Slides

Achievements & Awards

Research Scholarship by Machine Learning and Optimization Laboratory at EPFL, 2017
Academic Excellence Scholarship (discipline topper), IIT Gandhinagar, 2013
Cash Prize award for **Journal Publication**, IIT Gandhinagar, 2017 & 2015
Dean's List award for academic excellence in semesters I, II, III, IV, VI and VII of the bachelor's program at IIT Gandhinagar
High School Scholarship by Maharashtra State, ranked 22/700,000, 2007

Technical Skills

Programming: Python, C, R, Matlab, Shell, LaTeX, SQL
Libraries: sklearn, numpy, scipy, pandas, networkx, opencv, tensorflow, keras
Software: Weka, 8085 Simulator, Autodesk Inventor

Positions of Responsibility

Academic Secretary, Student Council IIT Gandhinagar *Apr '15 - Apr '16*
Primary Licensee and Lead Organizer, TEDxIITGandhinagar *Jan '14 - Aug '14*