

Akhilesh Gotmare

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MASTER'S STUDENT, COMPUTER SCIENCE, EPFL

EDUCATION	<p>École Polytechnique Fédérale de Lausanne (EPFL), Lausanne, Switzerland Master's, Computer Science, Sept '16 - present GPA: 5.26/6 (Overall)</p> <p>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)</p>
PREPRINTS AND PUBLICATIONS	<p>Gotmare A., Keskar N.S., Xiong C., & Socher R. (2018). A Closer Look at Deep Learning Heuristics: Learning Rate Restarts, Warmup and Distillation. <i>arXiv preprint arxiv:1810.13243</i> (partial results presented at <i>Workshop on Modern Trends in Nonconvex Optimization for Machine Learning, ICML 2018, Stockholm, Sweden.</i>)</p> <p>Gotmare A., Thomas V., Brea J., & Jaggi M. (2018) Decoupling Backpropagation using Constrained Optimization Methods. <i>Workshop on Efficient Credit Assignment in Deep Learning and Deep Reinforcement Learning, ICML 2018, Stockholm, Sweden</i> OpenReview</p> <p>Langvovoy M., Gotmare A., Jaggi M., & Sra S. (2017). Unsupervised robust nonparametric learning of hidden community properties. pre-print arxiv:1707.03494v1</p> <p>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. <i>Swarm and Evolutionary Computation</i>, 32, 68-84.</p> <p>Gotmare A., Patidar R., & George N. V. (2015). Nonlinear system identification using a cuckoo search optimized adaptive Hammerstein model. <i>Expert systems with applications</i>, 42(5), 2538-2546.</p>
EXPERIENCE	<p>Deep Learning Research Internship Supervisor(s): <i>Dr. Nitish Keskar, Dr. Caiming Xiong, Dr. Richard Socher</i> <i>Salesforce Research (Metamind), Palo Alto, US</i> Apr '18 - Sept '18</p> <ul style="list-style-type: none">- Studied mode connectivity and canonical correlational analysis as a tool for neural network loss landscape and activation analysis, partial results published at an ICML 2018 workshop- Building efficient language modelling architectures using attention only (Transformer decoders - Used representational analysis tools to localize failure of deep nets to adversarial perturbations and guide the design of robust defenses) <p>MSc Research Scholarship Program & Semester Project Supervisor(s): <i>Prof. Martin Jaggi, Dr. Mikhail Langovoy</i> <i>Machine Learning & Optimization Lab (MLO), EPFL, CH</i> Sept '16 - Feb '18</p> <p>Project on Model Parallel and Distributed Backpropagation</p> <ul style="list-style-type: none">- Studied scalable alternatives to backpropagation 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 <p>Project on Robust Learning of Hidden Network Properties</p> <ul style="list-style-type: none">- 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

Operating Systems
Algorithms
Computational Photography
Algorithms for Data Science
Data Management
Digital Signal Processing

Graduate

Machine Learning
Advanced Algorithms
Applied Data Analysis
Convex Optimization
Distributed Algorithms
Mathematics of Data
Automatic Speech Processing (ongoing)

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
Primary Licensee and Lead Organizer, [TEDxIITGandhinagar](#)

Apr '15 - Apr '16
Jan '14 - Aug '14