Peiyuan Zhang

Curriculum Vitae

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Education

Sept 2017 - Jul 2020 **ETH Zurich**, MSc in Electrical Engineering and Information Technology, Program GPA 5.7/6.0.
Thesis: A Dynamical System and Hyperparameter Control Approach for Faster Optimization.
Thesis supervisor: Prof. Thomas Hofmann, Prof. Roy Smith.

Sept 2013 - Jun 2017 **Xi'an Jiaotong University**, BEng in Automation, Electronic and Information Engineering Program, Outstanding Graduate, GPA 89.6/100, ranking 2/55.

Sept 2011 - Jun 2013 **Xi'an Jiaotong University**, Honor Youth Class preparatory.

Research Interests

Convex/non-convex (stochastic) optimization in machine learning.

Dynamics in learning algorithms.

Projects

Aug 2019 - Dec 2019 **Master Thesis**, Data Analytics Lab, ETH Zurich.
Title: A Dynamical System and Hyperparameter Control Approach for Faster Optimization.
Advisor: Prof. T. Hofmann, Prof. R. Smith, A. Orvieto, H. Daneshmand.
This thesis studies the mechanism of accelerated gradient methods (AGDs) from a continuous perspective. We propose a novel linear gradient ODE, utilizing first-order information only, which is proved be the origin of a bunch of known discrete methods and provides insights into properties of AGDs such as the role of extrapolation.

Nov 2018 - Feb 2019 **Student Semester Project**, Data Analytics Lab, ETH Zurich.
Title: Understanding Stochastic Heavy Ball Method.
Advisor: Prof. T. Hofmann, H. Daneshmand.
This project focus on the convergence property of stochastic accelerated gradient (SAGD) for regressional problems through the lens of Markov chain theory. We prove SAGD chain is ergodic and yields an accelerated convergence rate by a novel spectral radius analysis.

Oct 2017 - Jan 2018 **Student Semester Project**, Institute for Machine Learning, ETH Zurich.
Title: Non-submodular Maximization via Greedy Algorithms.
Advisor: Prof. J. Lygeros, Prof. J. Buhmann, Y. Bian.
This project aims at extending traditional notion of submodularity to weak submodularity by relaxation method. We propose novel greedy-like algorithms and establish guarantees to maximize weakly-submodular functions.

Jul 2016 - Sept 2016 **Research Intern**, Institute of Automation, Chinese Academy of Science.
Title: Semi-supervised Object Detection with Knowledge Transfer.
Advisor: Prof. Kaiqi Huang.

Publications

Rethinking the Variational Interpretation of Nesterov's Accelerated Method, NeurIPS 2021 .

Revisiting the Role of Euler Numerical Integration on Acceleration and Stability in Convex Optimization, AISTATS 2021.

Manuscripts and Preprints

An Efficient Full-matrix Adaptive Gradient Method with Approximate Rank-one Update, as preprint.

Mixing of Stochastic Accelerated Gradient Descent, as preprint.

Awards and Scholarships

2017 **Outstanding Graduate**, Xi'an Jiaotong University (top 5%).
2016 **National Endeavor Scholarship**, Xi'an Jiaotong University.
2016 **Merit Student**, Xi'an Jiaotong University.
2015 **Pengkang Scholarship**, Xi'an Jiaotong University.
2015 **Merit Student**, Xi'an Jiaotong University.

Skills

Programming Proficient in Python, Matlab.