

KEYI CHEN

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EDUCATION

Boston University • PhD in Computer Science • **Coursework:** Machine Learning, Convex Optimization, Probability in DS, Regression Theory, Categorical Data Analysis

Stony Brook University • MS in Applied Mathematics and Statistics • Specialization: Statistics • GPA: 3.8

Shandong University • BS in Applied Mathematics and Statistics • Specialization: Statistics • GPA: 3.5

RESEARCH INTEREST

My current research interest is parameter-free machine learning. In particular I am interested in online learning, batch/stochastic optimization. Current gradient-based algorithms' performance, for example, SGD and Adam largely rely on parameter selection. Parameter-Free algorithms remove the need of parameter tuning while still guarantees the optimal performance, which significantly improves the training efficiency.

Publication

Online Parameter-free Convex Optimization with Truncated Linear Models

Feb 2021

Author: Keyi Chen, Ashok Cutkosky, Francesco Orabona. [Preprints]

- Previous Parameter-free algorithms approximate loss functions with linear models. However, because of linearization, algorithms may occur instability issue. We creatively introduced truncated linear models to utilize the geometric curvature of the loss functions, which is better than linear models and improves the performance.
- We conducted extensive experiments to demonstrate the superiority of the proposed algorithm over competitors on real datasets; our algorithm's test error outperforms SGD, Adam, and AdaGrad.

Better Parameter-Free Stochastic Optimization with ODE Updates for Coin Betting

Jan 2020

Author: Keyi Chen, John Langford, Francesco Orabona. [Preprints] [[arXiv](https://arxiv.org/abs/2006.07507): <https://arxiv.org/abs/2006.07507>]

- We introduced ODE method into Parameter-Free algorithms. With the new tool from the continuous point of view, we solved the overshooting problem.
- The proposed algorithm in practice improves upon previous parameter-free method and is comparable to competitors on 38 real datasets from OpenML and LIBSVM.

WORK EXPERIENCE

Optimal Lab, Boston, Research Assistant, Advisor: Francesco Orabona

Jan 2019 – Now

- Propose novel parameter-free machine learning algorithms with theoretical reasoning.
- Implement algorithms in real-life tasks to verify the practical utility and compare it with existing methods empirically.

Accenture, Beijing (CN), Consultant Assistant (Transformation of Traditional Cable Industry)

Feb 2016 – May 2016

- Explored cable industry data, performed data analysis and visualization.
- Conducted cable industry research, prepared the research report and assisted the webpage database maintenance.

Citibank, Beijing (CN), Intern

June 2015

- Learned customer image based on the clients data, and proposed a VIP client driven marketing strategy.

PROJECTS

Detect Human upper bodies in the images

Nov 2018

- Implemented a Hard-Negative mining to solve imbalance instance problem, and using Lasso to obtain sparse features, and train SVM with HOG features.

Image Classification with CNN

Nov 2018

- Preprocessed data; designed and implemented a 2-d Convolutional Neural Network with PyTorch. Tuning parameters, optimizers, regularizers and etc. to improve the CNN model.

Credit Card Fraud Detection

Feb-April 2017

- Reduced dimension using PCA, explored the data by visualization, removed highly collinear features, and built a neural network, and implemented the detection model with Python and Tensorflow.

SKILLS

Programming: Python, Matlab, PyTorch | **Statistical Modeling:** Machine Learning/ Deep learning modeling, Statistical Data Analysis

COMMUNITY SERVICE

International summer camp, Kyiv, UA – Volunteer Teacher | **TEDxSDU**, Weihai, CN – Organizing team member