JIAN WANG

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EDUCATION

University of California, Los Angeles Sep. 2013 - Jun. 2019
Ph.D. Theoretical Physics, Computational Condensed Matter Physics GPA 3.888/4

University of Science and Technology of China Sep. 2009 - Jun. 2013
B.S. Applied Physics GPA 3.89/4.3

SKILL SET

Computer languages	Python, C/C++, MATLAB, R, Java, JavaScript, Linux cluster
Methods	Statistical data analysis, Machine learning, Monte Carlo simulations
Relevant classes	Computer organization, Data structure and algorithms, Statistical learning, Bayesian methods, Finance models, Computational physics(TA), Statistical physics(TA)

RECENT PROJECTS

Flight delay propagation in US airline network Summer 2019

- Designed and implemented tools to extract information from originally 40 GBytes of flight log with Pandas. Designed and implemented network epidemic process models using Numpy, Scikit-learn, NetworkX.
- Feature engineering via graph embedding, PCA, etc.. Train to predict delay-rate using a mix of linear model and random forest to gain an weighted mean absolute error of 11% (the naive Bayesian is 23%).

Statistical Models in Finance Course Project Spring 2019

- Implemented 6 models in python from scratch (Single Index Model, Constant Correlation Mode, Multiple Group Model, with/without short sale) to find efficient portfolios and analyze their performance over time.
- Implemented dataflow automation and visual display tools for resultant information via Jupyter Notebook.

RESEARCH PROJECTS

Statistical algorithm to solve inverse problem 2017 - 2018

- Explored, invented and implemented the Padé (rational function) regression method to solve the analytic function spectrum recovery problem in MATLAB and Python. The zeros and poles of the rational function may cancel each other, hence it provides an elegant way to reduce over-fittings in regression problems.
- Invented and implemented an error estimation mechanism with parametric bootstrapping allowing large tolerance of input uncertainty, which outperforms the traditional maximum entropy methods.

Numeric intensive computations 2016 - 2018

- Designed and implemented a large scale quantum Monte Carlo simulation for dissipative spin boson problem in both C++ and Python from scratch. Developed data pipeline and converging monitor tools in shell.
- Designed and implemented hashing, integrated probability, fast Fourier transform and gradient descent methods to maximize the code performance. A logarithmic acceleration is achieved.

Python package for quantum dynamics simulation 2014 - 2016

- Designed and developed a software package in Python that numerically solves quantum spin chain problem.
- By implementing the Jordan-Wigner transformation the general NP-hard problem was reduced to polynomial time. Invented a method to diagonalize the constrained matrix via SVD, eliminated the systematic error.

RESEARCH PAPERS

Study on Disordered and Dissipative Quantum Spin Systems [Ph.D. thesis advisor: Sudip Chakravarty]

Spectra of the Dissipative Spin Chain [2019 arxiv:1903.00567]

Rational function regression method for numerical analytic continuation [2018 arxiv:1812.01817]

Binary disorder in quantum Ising chains and induced Majorana zero modes [2018 arxiv:1808.04481]