Weizhi LIU

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Education

National University of Singapore | Department of Industrial Systems Engineering and Management — *Singapore*

Multi-objective Simulation Optimization, Ph.D. — *2014.08-2018.11*

- Research Topic : Optimal Computing Budget Allocation, Random Search, Simulation Analytics, Discrete Event Simulation.

Nanjing University | School of Management and Engineering — *Nanjing, China*

Industrial Engineering, B.Eng. ; Financial Engineering, B.Econ. — *2010.09-2014.06*

- Core Modules: Econometrics, Financial Engineering, Structured Finance, Financial Markets Microstructure, Financial Risk Management, Corporate Finance, Equity Analysis, Fixed Income Securities; Operations Research, Operations Management, Supply Chain Management.

Experience

National University of Singapore — *Singapore*

Research Fellow — *2018.10-Present*

- Design for High-Performance Framework of Multi-fidelity Simulation Optimization
- OCBA for Clustering and Classification
- Online Vehicle Routing Under Stochastic Demands Using Approximate Dynamic Programming
- Stowage Planning for American President Lines Ltd.

WorldQuant LLC — *Singapore*

Research Consultant (Quantitative Researcher) — *2018.09-Present*

- Developed 300++ quantitative trading strategies on the WorldQuant's WebSim platform to seek abnormal returns (or alpha) in the U.S. markets (Russell top 3000).
- The idea of my strategies comes from the utilization of various data sources (e.g., price/volume for equity, fundamental data, analyst estimate data, and sentiment data).
- Most strategies have high Sharpe ratios (∼2.2), stable annualised returns (∼10%, after neutralisation), low maximum drawdown (∼2%) and moderate daily turnover (∼18%).
- One among the top strategies has one-year out-sample Sharpe ratio 3.41 and five-year in-sample Sharpe ratio 2.52, see `http://greenwicher.com/me/misc/stock-long-short-trading-strategy.pdf`.
- Some trading strategies perform quite well even in a highly liquid stock pool (e.g., Russell top 200).
- Ranked the 1st place in the region of China and Singapore for the WorldQuant Spring Alphathon, 2017.
- Best Record: top 10 in the world.

Martian Capital Management PTE. LTD. — *Singapore*

Quantitative Researcher Intern — *2018.03-2018.09*

- Developed an automatic framework in Python to identify and visualize promising leading indicators for the prediction of the forward return of month-1 future contract of WTI/Brent Crude/Heating Oil/RBOB Gasoline/Gasoil.
- Developed a flexible backtesting framework in Python to cross-validate various multi-period strategies (and hyper-parameters) and generate a detailed tear sheet report via LaTeX.
- Developed several multi-factor long-short trading strategies with three years out-of-sample Sharpe ratio 1.4++ based on machine learning methods.

ADVANCE.AI — *Singapore*

Data Scientist Intern — *2017.07-2017.10*

- Proposed two graph-based anti-fraud algorithms (community and anomaly detection) for GoJek (an Indonesian company) in Hive SQL and Spark to identify fraudulent drivers/customers with abnormal topological structures in the co-occurrence graph.
- Deployed Tableau/Gephi dashboard to visualize the communities of fraudulent drivers/customers.
- Conducted feature engineering and applied isolation forest, ensemble supervised learning to provide fraudulent and abnormal scores for the given email addresses.

PyPRS *Singapore*

Designer & Developer *2016.03-2017.05*

- Proposed Partition-based Random Search (PRS) algorithm in Python to solve multi-objective optimization via simulation.
- Designed the architecture of the PRS algorithm.
- The components and test problems of the algorithm are encapsulated based on the object-oriented paradigm.
- Adopted SWIG to integrate the core code written in C++ with the Python main program to speed up the program's running efficiency.
- Visualized the search dynamics of PRS algorithm.
- `https://github.com/Greenwicher/PyPRS`

BiblioPy *Nanjing, China*

Developer *2014.04-2014.05*

- Proposed an algorithm in Python to discover the knowledge graph for a research field by the co-occurence and clustering methods.
- Implemented TF-IDF and TextRank to conduct the NLP analysis of the literature data and identify the key research topics of each academic community.
- Developed an automatic report generation tool via LaTeX and the visualization tool for Gephi.
- `https://github.com/Greenwicher/BiblioPy`

Honors & Awards

2019.01 **Passed FRM Part 2**, Global Association of Risk Professionals

2018.08 **Passed CFA Level I**, CFA Institute

2017.04 **Gold Medal**, WorldQuant Global Alpha Building Competition

2017.03 **Level 5 (Finalist)**, Google FooBar Coding Challenge

2014.05 **Graduate of Excellence**, Nanjing University

2013.02 **INFORMS Paper Award (0.04%, 2/5536)**, The Mathematical Contest in Modeling

2013.02 **Outstanding Winner (0.2%, 11/5536)**, The Mathematical Contest in Modeling

2011/2012 **Outstanding Volunteer**, The 4th, 5th "Caring for China" - the Google China Social Innovation Cup

Publications

[1] Weizhi Liu*, Haobin Li, Hui Xiao, Loo Hay Lee, and Ek Peng Chew. Optimal computing budget allocation for binary classification with noisy labels and its applications on simulation analytics. In *Proceedings of the 2019 Winter Simulation Conference*. IEEE, 2019.

[2] Juxin Li, Weizhi Liu*, Giulia Pedrielli, Loo Hay Lee, and Ek Peng Chew. Optimal computing budget allocation to select the non-dominated systems - a large deviations perspective. *IEEE Transactions on Automatic Control*, 2018.

[3] Chenhao Zhou*, Haobin Li, Weizhi Liu, Stephen Aloisius, Loo Hay Lee, and Ek Peng Chew. Challenges and opportunities in integration of simulation and optimization in maritime logistics. In *Proceedings of the 2018 Winter Simulation Conference*, pages 2897–2908. IEEE, 2018.

[4] Weizhi Liu*, Siyang Gao, and Loo Hay Lee. A multi-objective perspective on robust ranking and selection. In *Proceedings of the 2017 Winter Simulation Conference*, pages 2116–2127. IEEE, 2017.

[5] Weizhi Liu*, Siyang Gao, and Loo Hay Lee. A partition-based random search for multi-objective optimization via simulation. Under Review, 2017.

[6] Weizhi Liu, Juan Li*, Di Zhang, and Wei Chen. Fairness's effect on the pricing decisions of the supply chain. *Journal of Management Sciences in China*, 20(7):115–126, 2017.

[7] Cenying Yang, Wei Chen, and Weizhi Liu*. Make wise use of every drop. *Mathematical Modeling and Its Applications*, 2(5–6):75–89, 2013.

[8] Cheng Ji*, Weizhi Liu, and Huiwen Chen. Verification of option parity relations in domestic warrants market of china. In *Proceedings of 2013 3rd International Conference on Social Sciences and Society(ICSSS 2013)*, 2013.

[9] Cheng Ji*, Mengyi Niu, Weizhi Liu, and Jinyang Han. Joint distribution center model in university community. *China Journal of Commerce*, 11:091, 2013.