Orange(Yingzhi) Ao

✉ ya2538@email.com   📱 +1 917-518-4578   ⌗ My GitHub Page   in My LinkedIn Page

ABOUT ME

Cultivated by the past related experiences, my keen interest in FBSDEs and stochastic control optimization has led me to pursue a PhD, where I aim to develop innovative methodologies to enhance risk management strategies in dynamic financial environments.

References available upon request.

EDUCATION

Columbia University   Visiting Student   2024
GPA: 4.17 (Straight-A)
Related Courses

- ✓ Programming:
  Predictive Modeling with R(A), DS in Finance And Insurance(A+), Statistic ML(A),
- ✓ Math:
  Applied Stochastic Processes(A+)
- ✓ Integrated Project:
  Insurance Pricing with ML(A+)

Nanjing University   Bachelor of Economics (Financial Engineering)   2021-2025
GPA: 92
Related Courses

- ✓ Programming & ML:
  Python, Numerical Analysis and Application Software(MATLAB), *Financial Engineering, Applied Statistics II: Time Series (with Python), *Financial Time Series (with R), *AI
- ✓ Math & Stats:
  Probability Theory and Mathematical Statistics, Calculus I & II, Discrete Mathematics, Linear Algebra, ODE, *PDE, *Mathematics Finance
- ✓ Finance:
  Econometrics, Financial Risk Management, Securities Investment, *Options Investing Theories And Practices, Corporate Finance, Microeconomics, Macroeconomics, Accounting, International Finance, International Trade

  * is added before courses in progress.

RESEARCH EXPERIENCES AND PUBLICATIONS

Multi-Period Compliance MFG-FBSDEs in REC Market   RA   2024
Columbia University Stats Department

Under prof Campbell's supervision, I worked as an RA on the extended topic to his work *"Deep learning for principal-agent mean field games."* [1] and its application in REC markets. Here are the major things I did.

- ✓ Built up the FBSDE-MFG model and NN framework with PyTorch to reproduced the results of 1-Period-2-Agent Model in [1].
- ✓ Added additional period to the previous model and framework: Joint Optimization Model, considering for not just current but also future quotas.
- ✓ Proposed 3 numeric tricks to improve the model stability in seek of desired convergence: *clamp*, *sigmoid approximation*, and *logit transformation*.
- ✓ Experimented with different combos of NN model settings (e.g. optimizer, scheduler, layers etc.), parameters (e.g. lr), numeric tricks, and loss functions.
- ✓ Proposed a benchmark model - Separate Optimization Model - by running the 1P2A model twice, which gives a better view of differences made by long/short-sighted perspectives.
- ✓ Wrapped up codes into well-defined packages, published to **my GitHub repository** together with README instructions.
- ✓ Wrote a Report-Overview for big pictures and Report-Stepwise for detailed math and algorithm illustrations.

Low‑carbon Transition of China's Power System   RA   2023
Tsinghua‑CTG Joint Center for Climate Governance and Low‑carbon Transformation

Under supervision of main researcher Yang Qu, I assisted TCJCGLT in completion of the research report series "Low‑carbon Transition of China's Power System". My major works are as follows.

- ✓ Focused on 2 sections as major researcher and author of the report series.
    - ○ Construction of the national carbon market in China: key problems in market mechanism design and policy recommendations.
    - ○ Offshore wind industry in low‑carbon transition: bottleneck and future.
- ✓ Visualization - made all figures and tables for the report series.
- ✓ Collected references for other sections of the report series.
- ✓ Assisted completing and proof‑reading the draft versions.

PROJECT EXPERIENCES

Machine Learning In Insurance Pricing And Risk Modeling   2024.05 - 2024.08
Columbia University Actuarial Department

- ✓ **Team Collaboration** Collaborated with a team under supervision and mentoring of Carlos (Arocha Association) to carry out an innovative model for data‑driving insurance pricing strategy.
- ✓ **Risk Modeling In Python** Innovatively leveraged unsupervised learning (K‑Means, PCA, etc.) to identify risk levels based on policy data. Developed exposure rating methods to estimate risk premiums and prices for policies in each risk level.
- ✓ **Professional Reporting And Presenting** Delivered professional Statement of Work and Reports. Presented findings and consulting advice to clients.

Innovated Paired Trading Optimization with Genetic Algorithm   2023.09
Self‑Motivated Personal Project

- ✓ **Innovation** Replaced traditional single‑belt with double‑bound, which leads to less fluctuations and greater stability.
- ✓ **Genetic Algorithm** Learned GA from scratch and applied it to parameter optimization (i.e. coefficient, bandwidth), and customized fitness functions(e.g. Sharpe‑based to Return‑based).

WorldQuant Brain Consultant | Alphathon (Gold)   2023
Remote

- ✓ **Participate in NJU Alphathon 2023** Won the gold medal with monetary rewards by submitting qualified alphas. (11th place out of more than 200 candidates)
- ✓ **Contracted Consultant** Submitted qualified alphas and received allowances.

INTERNSHIP EXPERIENCES

TrexQuant Investment GAR Alpha Researcher 2024.06 - 2024.08
Remote

- ✓ **Market Psycology And Behavioral Investing** Focused on behavioral finance, refine ideas from papers and researches and transform ideas into alphas. Examined and submitted alphas through internal system(Trex Pysim).

Chongwen Quantitative   Quantitative Strategy Researcher (Stock)   2023.09 - 2024.02
Remote

- ✓ **Optimization of "Whitney George" Strategy** Optimized the strategy parameters w.r.t. A‑stock market, leading to an excess of 29% to the annual return of SSE 300 Index (2018‑Q1 to 2023‑Q4). The strategy is expected to be used for real trading from 2024‑Q4 on.
- ✓ **Construction And Maintenance of Trading System** Daily simulated the trading and generated formatted trading documents including strategy performance and re‑balancing instructions.

EXTRACURRICULAR ACTIVITIES

Presendent of NFEA External Relations Department   2023‑now
As a self‑managed non‑profit association, we aim to broaden members' career opportunities and potentials through reaching out to companies and recruiters. I am responsible for leading the core members and am in charge of the reach‑out affairs.

Core Member of Columbia College VESC   2024
I took the lead in organizing "Eastern Egg Hunting" and assisted organizing other 3 monthly activities, which helped to bring international students together and cultivate a sense of belonging.

SKILLS

Programming

- ✓ **Python | PyTorch, Pandas, Numpy, sklearn, etc.** Constructed DL models in the Summer Research, 2024 with Pytorch, familiar with common bugs and resolutions; advanced my DS and ML knowledge through intership, projects experiences, and courses *(school and coursera)*.

- ✓ **R | LM, GLM, tree models.** Accomplished course assignments in PM and FinTS; also achieved A in PM (rank 1 in midterm exam).

- ✓ **Other less proficient languages | C++, MATLAB** Earned CCF CSP-S 2nd Class Certificate in high school; accomplished course work and exams with MATLAB.

Academic Writing And Professional Typesetting

- ✓ **LaTeX | Academic Report Writing** I used Overleaf for purposes ranging from research reports to CV, which improves my LaTeXskills.

- ✓ **MicroSoft | Professional Report Writing** My real-world experiences from internships and mentorship of Carlos equipped me with professional typsetting skills, like meeting agendas, minutes as well as statements of work.

English

- ✓ **Proficiency Tests | TOEFL - 111/120 | GRE 333/340**

- ✓ **Oversea Experiences** Lived in NY for 8 months and made bunch of native friends who help me getting rather good at daily communication.

Team Working And Communicating

- ✓ **Responsibility** I managed to take leading roles in extracurricular activities, responsible for core decision-making and planning, which required me to be assertive and open at the same time.

- ✓ **Collaboration** My diverse experiences in research, internship, course projects, as well as in student associations required me to: 1) navigate my specific role in the team (assistant, mentee, or peer/teammate); 2) ask questions and listen; 3) share constructive and respectful feedback.

CERTIFICATIONS & AWARDS

- ✓ **Qualifications And Competitions**
  - ○ CCF CSP-S 2nd Class (C++)
  - ○ Brain Alphathon 2023 11th Place
  - ○ *ACCA *(Passed 7 Out of 13)*

- ✓ **Scholarships**
  - ○ Jiangsu Huihong Livestock High Scholarship
  - ○ People's Scholarship
  - ○ Guotai Life Scholarship

- ✓ **Others**
  - ○ Piano *(professional level 10)*
  - ○ Sketch *(professional level 8)*
  - ○ Running: The 20th Jiangsu Provincial Games Women's Group 5KM Silver, 10KM Silver *(National 2nd Class Athletes Standard)*; Half-Marathon *(Personal Best 1:27:19)*

APPENDIX

Abbreviations

- ✓ NN: Neural Network
- ✓ ML: Machine Learning
- ✓ DS: Data Science
- ✓ NFEA: Nanjing University Financial Engineering Association
- ✓ VESC: Visiting And Exchange Student Council
- ✓ TCJCGLT: Tsinghua-CTG Joint Center for Climate Governance and Low-carbon Transformation
- ✓ CCF CSP-S: China Computer Federation Certified Software Professional-Senior

Citation(s)

[1] S. Campbell, Y. Chen, A. Shrivats, and S. Jaimungal, *Deep learning for principal-agent mean field games*, 2021. arXiv: 2110.01127 [cs.LG]. [Online]. Available: https://arxiv.org/abs/2110.01127.