Tianyi Yang (Tim)

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About Me

I am currently a quantitative trader intern at 4 Alpha Capital. Being an intern, I manage US$500,000 equivalent assets with a risk-neutral arbitrage strategy in cryptocurreny. I obtained my Ph.D. at the Chinese University of Hong Kong and developed interdisciplinary skillsets in both machine learning and system engineering. My research focuses on machine learning and reliability engineering of cloud systems. Till Feburary 2023, I have published papers in top conferences.Besides, I also spent time at Microsoft Research Asia, Huawei Cloud, and Ant Financial as a research intern/data analyst intern. I am open to full-time _Quantitative Trader_/ _Applied Scientist_ positions in Hong Kong and Shenzhen now. I am eligible to work in Hong Kong without visa sponsorship.

Education

The Chinese University of Hong Kong — Hong Kong SAR
Ph.D. in Computer Science and Engineering; Supervisor: Prof. Michael R. Lyu; GPA: 3.7/4.0 — _Aug 2018 – Nov 2022_

- **Thesis Title**: Towards Reliable Cloud Microservices with Intelligent Operations.

Sun Yat-Sen University — Guangzhou, China
B.Eng. in Computer Science and Technology; GPA: 3.9/4.0 — _Aug 2014 – June 2018_

- **Highlighted Courses**: Distributed Systems, Cloud Computing, High Performance Computing, Operating Systems, Computer Architecture, Computer Networks, Data Minig and Machine Learning.
- **Honors**: National Scholarships (Top 2%).

Experience

4 Alpha Capital — Hong Kong SAR
Quantitative Trader (Internship) — _December 2022 - now_

- **Funding Rate Arbitrage**: Totally US$500,000 equivalent assets under management as an intern. Achieved over 20% annualized rate of return with a risk-neutral arbitrage strategy.
- **Factor Research**: Conducted Orderbook-related factor research for high-frequency trading. Implemented 8 categories of factors, 5 of which exhibit a statistically significant strong correlation with future returns.

Huawei Cloud — Shenzhen, China
Research Engineer (Internship) — _June 2020 - May 2022_

- **Dependency Evaluation in Microservices**: Proposed a novel concept to model the state propagation between microservices (i.e., intensity of dependency), and an efficient heuristic algorithm to evaluate the intensity of dependency. Published a conference paper in ASE'2021.
- **Evaluating the Quality of Alerts**: Proposed a learning-based framework to evaluate the Quality of Alerts (QoA) to achieve automatic alert governance in the cloud so as to accelerate the alert diagnosis of On-Call Engineers. Published a conference paper in DSN'2022.
- **Multi-modal Learning for System Anomaly Detection**: Proposed a multi-modal deep learning model to detect system anomalies on multi-dimensional time series. Published a conference paper in ICSE'2023.
- **Self-adaptive Resilience Testing**: Proposed a self-adaptive approach to automatically evaluate the resilience of microservice systems based on fault injection and multi-dimensional metric analysis. The paper is under review.

Data, Knowledge, Intelligence Group, Microsoft Research Asia (MSRA) — Beijing, China
Research Engineer (Internship) — _June 2019 - Aug 2019_

- **Root Cause Diagnosis in Azure**: Identifying root causes of many incident storms of Azure's cloud services via a heuristic search algorithm in multi-variate incident tickets.

Alipay, Alibaba Group — Hangzhou, China
Data Scientist (Internship) — _Jul 2017 - Oct 2017_

- **Anti Cash-out Model**: Core risk management service for consumer finance. Utilized distance metric learning to automatically discover the most informative meta-path on heterogeneous information network and prevent cash-out.
- **Car Owner Prediction**: Created a decision tree model that predicts with high accuracy whether a user has a car based on the user's behavior over a certain period of time. The model passed the internal review and was deployed in the production environment.

Publications

1   C. Lee, **T. Yang**, Z. Chen, Y. Su, and M. R. Lyu, "Eadro: An end-to-end troubleshooting framework for microservices on multi-source data," in *Proceedings of IEEE 45th International Conference on Software Engineering*, IEEE, 2023.

2   C. Lee, **T. Yang**, Z. Chen, Y. Su, Y. Yang, and M. R. Lyu, "Heterogeneous anomaly detection for software systems via semi-supervised cross-modal attention," in *Proceedings of IEEE 45th International Conference on Software Engineering*, IEEE, 2023. 🔗 URL: https://arxiv.org/abs/2207.02918.

3   J. Shen, P. Zuo, X. Luo, **T. Yang**, Y. Su, Y. Zhou, and M. R. Lyu, "Fusee: A fully memory-disaggregated key-value store," in *Proceedings of the 21st USENIX Conference on File and Storage Technologies*, USENIX, 2023. 🔗 URL: https://www.usenix.org/conference/fast23/presentation/shen.

4   **T. Yang**, C. Lee, J. Shen, Y. Su, Y. Yang, and M. R. Lyu, "An adaptive resilience testing framework for microservice systems," in *arXiv preprint*, 2022. 🔗 URL: https://arxiv.org/abs/2212.12850.

5   **T. Yang**, C. Lee, J. Shen, Y. Su, Y. Yang, and M. R. Lyu, "Managing service dependency for cloud reliability: The industrial practice," in *Companion Proceedings of IEEE 33rd International Symposium on Software Reliability Engineering*, IEEE, 2022, pp. 67–68. 🔗 DOI: 10.1109/ISSREW55968.2022.00041.

6   **T. Yang**, J. Shen, Y. Su, X. Ren, Y. Yang, and M. R. Lyu, "Characterizing and mitigating anti-patterns of alerts in industrial cloud systems," in *Proceedings of IEEE/IFIP 52nd International Conference on Dependable Systems and Networks*, IEEE/IFIP, 2022, pp. 1–9. 🔗 DOI: 10.1109/DSN53405.2022.00047.

7   S. He, P. He, Z. Chen, **T. Yang**, Y. Su, and M. R. Lyu, "A survey on automated log analysis for reliability engineering," *ACM Computing Surveys*, vol. 54, no. 6, pp. 1–37, 2021. 🔗 DOI: 10.1145/3460345.

8   J. Shen, **T. Yang**, Y. Su, Y. Zhou, and M. R. Lyu, "Defuse: A dependency-guided function scheduler to mitigate cold starts on faas platforms," in *Proceedings of IEEE 41st International Conference on Distributed Computing Systems*, IEEE, 2021, pp. 194–204. 🔗 DOI: 10.1109/ICDCS51616.2021.00027.

9   **T. Yang**, C. Gao, J. Zang, D. Lo, and M. Lyu, "Tour: Dynamic topic and sentiment analysis of user reviews for assisting app release," in *Companion Proceedings of the Web Conference*, 2021, pp. 708–712. 🔗 DOI: 10.1145/3442442.3458612.

10   **T. Yang**, J. Shen, Y. Su, X. Ling, Y. Yang, and M. R. Lyu, "Aid: Efficient prediction of aggregated intensity of dependency in large-scale cloud systems," in *Proceedings of IEEE/ACM 36th International Conference on Automated Software Engineering*, IEEE, 2021, pp. 653–665. 🔗 DOI: 10.1109/ASE51524.2021.9678534.

Patents

1   M. Lyu, B. Li, **T. Yang**, Z. Chen, and Y. Su, "A microservice fault diagnosis method and system," CN202211368449.4, 2022.

2   M. Lyu, J. Liu, **T. Yang**, Z. Chen, and Y. Su, "Method and device for anomaly detection based on cloud service multivariate monitoring indicators," CN202211049895.9, 2022.

3   **T. Yang**, H. Xiang, Z. Chen, and Y. Yang, "A technology for adaptive and automated resilience testing of microservice systems," Issued to Huawei Technologies, 2022.

Honors and Awards

- **Honors**
  - ○ **Outstanding Ph.D.**, The 20th Chinasoft Conference, Chongqing, China   *2022*
  - ○ **Postgraduate Studentship**, The Chinese University of Hong Kong   *2018-2022*
  - ○ **Excellent Teaching Assistantship**, The Chinese University of Hong Kong   *2020*
- **Competitions Awards**
  - ○ **Meritorious Winner**, Mathematical Contest in Modeling   *2017*
  - ○ **First Prize**, Contemporary Undergraduate Mathematical Contest in Modeling   *2016*
  - ○ **Outstanding Winner**, "RoboCup" Home Robot Competition   *2014*

Teaching

- **In The Chinese University of Hong Kong**
  - **CSCI3100** Software Engineering (Tutorial) *Spring 2019, Spring 2020, Spring 2021*
  - **ENGG5108** Big Data Analysis (Tutorial) *Fall 2019*
  - **CMSC5733** Social Computing (Tutorial) *Fall 2018*

Side Projects

- **File System for Block Storage Devices**: Implemented a user-space file system that supports common file-related system call for block device using FUSE. 🔗 https://github.com/yttty/isfs
- **Assembler & CPU Simulator**: Implemented an assembler to compile assembly code and a CPU simulator to execute the machine code. 🔗 https://github.com/yttty/exp-isa
- **Graph Embedding**: Implemented a node embedding algorithm for homogenous graph with biased random walk, which efficiently explores neighborhood similarity and structural similarity when two nodes are completely disconnected.

Programming Skills

- **Languages**: Python, C++, SQL   **Frameworks**: Kubernetes, Docker, PyTorch, Spark, FUSE