Ziyue LI (Bonald)

Ph.D. Candidate
Department of Industrial Engineering and Decision Analytics (IEDA)
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Education

Ph.D. in Industrial Engineering and Decision Analytics — *09.2017-09.2021*
The Hong Kong University of Science and Technology — Hong Kong
Concentration: Data mining;Statistical learning model and algorithm
Minor: Machine Learning
Advisor: Prof. Fugee Tsung (with Prof. Hao Yan, Prof. Chen Zhang)

Exchanging in Mechanical and Manufacturing Engineering — *2015-2015*
University of New South Wales — Sydney, Australia
CSC Scholarship (Distinguished)

Bachelor of Engineering in Mechanical Engineering — *2013-2017*
Bachelor of Economics in Finance — *2014–2017*
Xi'an Jiaotong University — Xi'an , China
GPA: 3.76/4.3 Ranking: 6th/255, Top 5%
Outstanding Graduates Award, National Scholarship

Research Interests

My research interests focus on high-dimensional data mining methodologies for real-world problems. Specifically, the goal is to build up novel models that preserves the innate data structure, and combines the data-driven methods with domain-specific knowledge, for higher accuracy and efficiency, and greater interpretability. My current research includes tensor analysis, spatiotemporal high-dimensional data, topic models, transfer learning, and so on.

Selected Awards

- **Best Student Paper Award**, INFORMS 2020 Data Mining Section, **Finalist Award** (2020): Selected out of 40 submissions.
- **Best Student Paper Award**, INFORMS 2020 Quality, Statistics, and Reliability (QSR) Section, **Finalist Award** (2020): Selected out of 26 submissions.
- **Best Conference Paper Award**, IEEE International Conference on Automation Science and Engineering (CASE) 2020, **Winner** (2020): Selected out of 500 submissions.
- **HKUST Excellent Research Award** (2017): Highly-selective.
- **1st Runners-up, Audience Award**, Hackathon@UST - Uber Smart Transportation (2018).
- **Hong Kong Ph.D. Fellowship Scholarship Award** (2017-2020): Highly-selective and prestigious, 2 recipients in IEDA.

Conference Publications

[C1] **Z. Li**, "Tensor Topic Models with Graphs and Applications on Individualized Travel Patterns", IEEE 36th International Conference on Data Engineering (ICDE), 2020, submitted.

[C2] **Z. Li**, H. Yan, C. Zhang and F. Tsung, "Long-Short Term Spatiotemporal Tensor Prediction for Passenger Flow Profile" in IEEE 16th International Conference on Automation Science and Engineering (CASE), 2020, published.

- **Winner** of IEEE CASE 2020 **Best Conference Paper Award**.

[C3] **Z. Li**, N. D. Sergin, H. Yan, C. Zhang, and F. Tsung, "Tensor Completion for Weakly-Dependent Data on Graph for Metro Passenger Flow Prediction" Proceedings of the AAAI Conference on Artificial Intelligence, 2020, published.

- **Best Student Paper Award**, Quality, Statistics, and Reliability (QSR), INFORMS 2020, **Finalist Award**.
- AAAI: Top-tier conference in machine learning and artificial intelligence.

Journal Publications

[J1] **Z. Li**, H. Yan, C. Zhang and F. Tsung, "Long-Short Term Spatiotemporal Tensor Prediction for Passenger Flow Profile" IEEE Robotics and Automation Letters, 2020, published.

[J2] F. Tsung, **Z. Li**, "Discussion of 'A novel approach to analysis of spatial and functional data over complex domains'" Quality Engineering, 2020, published.

Working Papers

[W1] **Z. Li**, H. Yan, C. Zhang, and F. Tsung, "Individualized Passenger Travel Pattern Multi-Clustering based on Tensor Latent Dirichlet Allocation".

- **Best Student Paper Award**, Data Mining, INFORMS 2020, **Finalist Award**.

[W2] **Z. Li**, K. Zhang, H. Yan and F. Tsung, "Transfer Learning based Profile Decomposition for Cold-start Data Anomaly Detection".

Invited Talks

1. *"Individualized Passenger Travel Pattern Multi-Clustering based on Tensor Latent Dirichlet Allocation with Graph Structure"* *11.2020*
INFORMS Annual Meeting 2020 National Harbor, U.S.A

2. *"Tensor Completion for Weakly-dependent Data on Graph for Metro Passenger Flow Prediction"* *10.2019 and 01.2020*
Data Science Symposium Waseda University Tokyo, Japan
INFORMS Annual Meeting 2019 Seattle, U.S.A

3. *"Transfer-learning-based Anomaly Detection for Monitoring Profiles in the 'Start-up' State"* *11.2018*
INFORMS Annual Meeting 2018 Phoenix, U.S.A

Research Experience

Graph-Regularized Tensor Topic Model *2019 - 2020*
Keywords: topic models, high-dimensional data, graph-structure

- High-dimensional tensor topic models with Latent Dirichlet Allocation
- External information such as graph to improve model interpretability
- Online variational EM algorithm to speed up learning

Tensor decomposition and completion on graph data *2018 - 2020*
Keywords: tensor, spatio-temporal data, graph structure

- Tensor decomposition and completion for spatiotemporal data prediction
- Graphs structure to improve the performance
- Block coordinate descent algorithm for efficient learning

Transfer learning for anomaly detection *2017 - 2019*

Keywords: transfer learning, multi-task learning, outlier, anomaly detection

- Transfer learning model with parameter transfer and feature representation transfer approach
- Decompose data profile and detect anomaly

Industry Experience

Cloud Computing Scientist (Intern) *09.2019 - 02.2020*
Nokia Bell Labs Stuttgart, Germany

- Research in serverless computing, machine learning system based on Amazon Web Service (AWS) and Bell Labs KNIX MicroFunctions.
- Conducted serverless machine learning inference (regression, nature language process, image recognition) in AWS and Microfuntions, performance analysis, component profiling and system optimization.

Top 10 *in Global Big Data Competition* *07.2018 - 08.2018*
JD.com Beijing, China

- Quantile boosting prediction model with effective feature engineering and representation methods and improved forecast accuracy by 72%.

1st-Runners-up, ***Audience Award*** *in Hackathon@UST* *04.2018 - 05.2018*
Uber Smart Transportation Hong Kong

- Developed facial recognition model to achieve facial car door unlocking, underage driving detection and drowsy driving detection.

Other Awards

- **Honored Graduate Award**, Xi'an Jiaotong University *2017*
- **National Scholarship**, Xi'an Jiaotong University *2016*
- **National First Prize**, The 14th "Challenge Cup" National College Students' Extracurricular Academic Science and Technology Contest *2015*
- **National Encourage Scholarships**, Xi'an Jiaotong University *2014, 2015*

Skills

- Python • R • Matlab • AWS • C++
- Chinese (Native) • English (Fully Professional) • German (B2)

Reference

- **Prof. Fugee Tsung** (Ph.D. Supervisor)
  Chair Professor and Acting Dean
  Department of Industrial Engineering and Decision Analytics
  The Hong Kong University of Science and Technology, Hong Kong
  Email: season@ust.hk, *Phone*: +852 2358-7097
- **Prof. Hao Yan** (Research Collaborator)
  Assistant Professor
  School of Computing, Informatics, & Decision Systems Engineering
  Arizona State University, U.S.A
  Email: haoyan@asu.edu, *Phone*: +1 (480) 727-0556
- **Prof. Chen Zhang** (Research Collaborator)
  Associate Professor
  Industrial Engineering
  Tsinghua University, China
  Email: zhangchen01@tsinghua.edu.cn, *Phone*: +86-10-62796135