

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 (QS ranking: 27th) Hong Kong
- Concentration: Data mining; Statistical learning models and algorithms
- Minor: Machine Learning
- Advisor: Prof. Fugee Tsung, collaborating with Prof. Hao Yan (Arizona State University, U.S.A) Prof. Chen Zhang (Tsinghua University, China)

Exchanging in Mechanical and Manufacturing Engineering 2015-2015
University of New South Wales Sydney, Australia
- China Scholarship Council (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**, H. Yan, C. Zhang, and F. Tsung, "Individualized Passenger Travel Pattern Multi-Clustering based on Tensor Latent Dirichlet Allocation". 27th ACM SIGKDD Conference on Knowledge Discovery and Data Mining (KDD '21), *submitted*.
- **Best Student Paper Award**, Data Mining, INFORMS 2020, **Finalist Award**.

	<ul style="list-style-type: none"> • KDD: Top-tier conference in data mining & analysis.
	<p>[C2] Z. Li, “Tensor Topic Models with Graphs and Applications on Individualized Travel Patterns”, 2021 IEEE 37th International Conference on Data Engineering (ICDE), Crete, Greece, 2021, accepted and forthcoming.</p> <ul style="list-style-type: none"> • ICDE: Top-tier conference in data mining.
	<p>[C3] 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.</p> <ul style="list-style-type: none"> • Winner of IEEE CASE 2020 Best Conference Paper Award.
	<p>[C4] 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.</p> <ul style="list-style-type: none"> • 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	<p>[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.</p> <p>[J2] F. Tsung, Z. Li, “Discussion of ‘A novel approach to analysis of spatial and functional data over complex domains’” Quality Engineering, 2020, published.</p> <p>[J3] Z. Li, K. Zhang, H. Yan and F. Tsung, ”Decomposition-based Hybrid Transfer Learning for Cold-start Data Anomaly Detection”. The ACM Transactions on Knowledge Discovery from Data (TKDD), 2021, <i>submitted</i>.</p>
Working Papers	<p>[W1] Z. Li, H. Yan, C. Zhang, and F. Tsung, ”Online Tensor Dirichlet Process Multinomial Model with Graphs for Individual Passenger Clustering,” working paper.</p> <p>[W2] M. Li, Z. Li, and F. Tsung, ”Spatiotemporal Attention-based Auto-Encoder for Dynamic Metro Station Clustering,” working paper.</p>
Research Experience	<p>Graph-regularized tensor topic model <i>2019 - 2020</i> <i>Keywords: natural language processing, generative model, tensor, graph-structure</i></p> <ul style="list-style-type: none"> • Developed high-dimensional tensor topic models (LDA, DPMM short-text model) • Incorporated external information as graph to improve model interpretability • Sped up learning via online variational EM algorithm with stochastic gradient <p>Tensor decomposition & completion prediction on graph data <i>2018 - 2020</i> <i>Keywords: tensor, time series prediction, spatio-temporal data, graph structure</i></p> <ul style="list-style-type: none"> • Developed tensor decomposition based prediction with 2D-ARIMA model, and tensor completion based prediction for spatiotemporal data • Incorporated graphs structure to improve the prediction accuracy • Adopted block coordinate descent algorithm for efficient learning <p>Transfer learning for anomaly detection <i>2017 - 2019</i> <i>Keywords: transfer learning, multi-task learning, outlier, anomaly detection</i></p> <ul style="list-style-type: none"> • Proposed hybrid transfer learning model with parameter transfer and feature representation transfer approach

	<ul style="list-style-type: none"> Proposed a decomposition model for data profile to detect anomaly accurately 	
Industry Experience	Project Manager MTR Co.-HKUST Project	09.2020 - present Hong Kong
	<ul style="list-style-type: none"> Research project collaboration and management with MTR and Computer Science & Engineering Dept, HKUST, developing an Intelligent Transport System (ITS) for smarter and individualized services based on data-driven methods. 	
	Cloud Computing Scientist (Intern) Nokia Bell Labs	09.2019 - 02.2020 Stuttgart, Germany
	<ul style="list-style-type: none"> 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 Microfunctons, performance analysis, component profiling and system optimization. 	
	Top 10 in Global Big Data Competition JD.com	07.2018 - 08.2018 Beijing, China
	<ul style="list-style-type: none"> 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 Uber Smart Transportation	04.2018 - 05.2018 Hong Kong
	<ul style="list-style-type: none"> Developed facial recognition model to achieve facial car door unlocking, under-age driving detection and drowsy driving detection. 	
Teaching Experience	Teaching Assistant , MATH5470-Statistical Machine Learning (PG)	Spring, 2021
	<ul style="list-style-type: none"> Took charge of tutorials covering contents of supervised learning such as regression, classification, regularization, neural networks and support vector machine; and unsupervised learning such as random forests. 	
	Teaching Assistant , IEDA2200-Engineering Management (UG)	Spring, 2020
	<ul style="list-style-type: none"> Took charge of all tutorials covering contents of production line optimization, time-series forecasting, inventory management and manufacturing strategy. 	
	Co-instructor , IEDA3270-Quality Engineering (UG)	Spring, 2019
	<ul style="list-style-type: none"> Led all lab experiments including statistics, factorial design, control charts, and regression models. 	
	Teaching Assistant , EEMT5220-Six Sigma Quality Management (PG)	Fall, 2018
	<ul style="list-style-type: none"> Took charge of all tutorials covering contents of statistical analysis, hypothesis testing, statistical process control. 	
Invited Talks	1. "Individualized Passenger Travel Pattern Multi-Clustering based on Tensor Latent Dirichlet Allocation with Graph Structure" INFORMS Annual Meeting 2020	11.2020 National Harbor, Maryland, U.S.A
	2. "Tensor Completion for Weakly-dependent Data on Graph for Metro Passenger Flow Prediction" Data Science Symposium Waseda University INFORMS Annual Meeting 2019	10.2019 and 01.2020 Tokyo, Japan Seattle, Washington, U.S.A
	3. "Transfer-learning-based Anomaly Detection for Monitoring Profiles in the 'Start-	

**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 Undergraduate Curricular Academic Science and Technology Contest 2015
- **National Encourage Scholarships**, Xi'an Jiaotong University 2014, 2015

Skills

- Python • R • Matlab • AWS • C++ • Hadoop, Map-Reduce
- 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
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- **Prof. Chen Zhang** (Research Collaborator)
Associate Professor
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