Dingyi ZHUANG

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EDUCATION

McGill University
Montreal, Canada
Master (Thesis) in Transportation Engineering *Sep. 2019- Present*

- **Supervisor:** Prof. Lijun Sun
- **Research interest:** Urban Computing, Data Mining, Graph Network, Probabilistic Model
- **CGPA: 3.74**/4

Shanghai Jiao Tong University
Shanghai, China
Bachelor of Science in Mechanical Engineering *Sep. 2015 - July. 2019*

- **Tsien Hsue-Shen Class:** Honors Program in Shanghai Jiao Tong University (top **5%**).
- **Overall GPA: 3.55**/4 (**85.67**/100), **Ranking: 3**/8

Selected Honors & Awards:

- Graduate Excellence Fellowship, McGill University
- First Prize (1/130), Chinese University Students Big Data Innovation Application and Modeling Contest
- Chungtsung Scholarship (10%), Hui-Chun Chin and Tsung Dao Lee Endowment Program Commission
- Eleme Scholarship (5%, twice), Shanghai Jiao Tong University
- Excellent Student (5%), Shanghai Jiao Tong University

PUBLICATIONS

- **D. Zhuang**, S. Hao, D.H. Lee, J.G Jin, From compound word to metropolitan station: Semantic similarity analysis using smart card data, *Transportation Research Part C: Emerging Technologies*.
- **D. Zhuang**, J.G. Jin, Y. Shen, W. Jiang, Understanding the bike sharing travel demand and cycle lane network: the case of Shanghai, *International Journal of Sustainable Transportation*.
- **D. Zhuang**, J.G. Jin, Y. Shen, W. Jiang, An empirical study on cycle lane network using bike sharing data: the case of Shanghai, *2018 International Conference on Transportation and Space-time Economics*.
- S. Hao, **D. Zhuang**, D. Zhao, D.H. Lee, A Pseudo-3D Convolutional Neural Network based Framework for Short-term Mixed Passenger Flow Prediction in Large-scale Public Transit, *Transportation Research Board 2020*.
- **D. Zhuang**, L. Sun, Modeling Paratransit Demand with Hankel-structured Poisson Tensor Factorization (submitted to TRB 2021)
- S. Hao, **D. Zhuang**, D.H. Lee, A spatial-temporal Deep Learning Framework for Network-wide Bus Passenger Flow prediction, *IET Intelligent Transport Systems*. (Provisionally accepted)
- Y. Wu, **D. Zhuang**, L. Sun, Inductive graph neural networks for spatiotemporal kriging. (Submitted to NeurIPS 2020)
- F.Q. Liu, J.W. Wang, **D. Zhuang**, J.B. Tian, Luis Miranda-Moreno, L. Sun. A General Framework Based on Temporally Dynamic Adjacency Matrix for Long-Term Traffic Prediction. (Preprint)

SELECTED RESEARCH EXPERIENCE

Modeling Paratransit Demand with Hankel-structured Poisson Tensor Factorization ***Canada***
Master Student, McGill University *May. 2020 - Aug. 2020*
Advisor: Lijun Sun, Assistant Professor, McGill University

- Derived and implemented Hankel-based Poisson Tensor Factorization to learn latent seasonal spectrum of paratransit service for the disabled people in the region-level.
- Enhanced interpretability traditional probabilistic factorization model, and conducted cases studies on both temporal and spatial latent modes to discover behaviors from sparse and dispersed paratransit data.

Inductive Graph Neural Networks for Spatiotemporal Kriging ***Canada***

Master Student, McGill University *Apr. 2019 - Jun. 2020*

Advisor: Lijun Sun, Assistant Professor, McGill University

- Developed a dynamic sampling based inductive framework of graph neural network to recover data for unsampled sensors on a network/graph structure.
- Learned the spatial message passing mechanism by generating random subgraph samples and adjacency, then reconstructing signals on them.
- Implemented and outperformed advanced spatial kriging and matrix completion models on various spatiotemporal datasets to test the inductive ability.

Pseudo-3D CNN based Framework for Short-term Mixed Passenger Flow Prediction ***Singapore***

Research Student, National University of Singapore *Apr. 2019 - Aug. 2019*

Advisor: Lee Der-Horng, Elected Fellow, Academy of Engineering Singapore

- Proposed a Pseudo-3D Convolutional Neural Network (Pseudo-3DCNN) based model to predict the public transport passenger flow in a network-wide region level.
- Took metro passenger flow, bus passenger flow as well as the transfer flow between metro system and bus system together into consideration instead of merely predicting a single type of passenger flow.
- Presented paper in *Transportation Research Board 2020.*

Understanding Semantic Similarity among Subway Stations Using Smart Card Data ***Singapore***

Research Student, National University of Singapore *Jul. 2018 - Sep. 2018*

Advisor: Lee Der-Horng, Elected Fellow, Academy of Engineering Singapore

- Designed a station2vec approach using word2vec model in natural language processing and proposed to interpret station vectors as compound words to comprehend their mobility and service semantics.
- Applied stacked autoencoder on smart card data and topic modeling on Point of Interest data to discover the mobility and service semantics respectively to obtain a deeper similarity between subway stations.
- Completed all modeling and coding work independently, and then proposed several urban planning and commercial suggestions based on similarity analysis. Paper published in *TR Part C.*

Empirical Study on Cycle Lane Network of Shanghai Using Bike Sharing Data ***Shanghai, China***

Team Leader, Chuntsung Program of Shanghai Jiao Tong University *Mar. 2017 - Jun. 2018*

Advisor: Jiangang Jin, Associate Professor at School of Civil Engineering, Shanghai Jiao Tong University

- Designed procedures to scrape data automatically from the bike-sharing application and applied graphic clustering to mine the insight of four different bike-sharing mobility patterns.
- Suggested a method to explore cycle lane network based on bike-sharing mobility configurations and proposed policy recommendations accordingly.
- Presented paper on TSTE 2018 and published in *International Journal of Sustainable Transportation*.

SKILLS

- Programming: Python, R, C/C++, HTML
- Tools: MATLAB, Visio, Latex, MySQL, Hadoop, Origin
- Languages: GRE: 321+3 (AW)
- Hobbies: Reading (history, technology, psychology), Sports (basketball, running)