Han Qiu

Contact Information

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Work Experience

Ride-hailing Business Group, Meituan-Dianping, Beijing, China

Software Development Engineer **May, 2018 - present**

Includes a variety of projects on ride-hailing operations.

- Conducted personalized modeling of travelers' behavior under the impact of dynamic pricing and coupons, and then solved (myopic) optimal control schemes with linear programming.
- Based on existing works in the literature, proposed a model to characterize the macroscopic supply and demand structure and validated its accuracy with real-world data. The model has been used as a decision support module for a range of operational tools and algorithmic strategies.
- Formulated and solved a maximum flow problem to provide structural information and generate features for developments of matching and dispatching strategies.
- Developed a multi-agent simulation system for the ride-hailing dynamics; this system has been used to evaluate new dispatching strategies and train reinforcement learning agents.

Shared Mobility Research Lab, Shanghai International Automobile City, Shanghai, China

Researcher **September, 2017 - May, 2018**

Includes several projects on the inference and prediction of traveler behavior in a carsharing business.

- Constructed and estimated a structural model of traveler coupon redemption behavior, with a focus on travelers' perceptions of future coupon redemption utilities and their awareness of available coupons
- Developed a long short-term memory (LSTM) network to estimate the impacts of users' negative comments on their trip frequencies in the future
- Developed deep learning models for personalized demand forecasting

Shanghai Yuan Lan (Evolution Labs) Information Technology Co., Ltd, Shanghai, China

Research Intern **December, 2017 - May, 2018**

Implemented state-of-the-art reinforcement learning algorithms, including PPO, DDPG, and DQN, for alpha mining and trading signal discovery in Chinese commodity markets. Developed several reward shaping schemes to further improve learning efficiencies.

Dublin Research Lab, International Business Machines Corporation, Dublin, Ireland

Research Intern **June, 2017 - September, 2017**

Developed a time-series embedding algorithm for fast top-k correlation searches in time-series databases, with a focus on deep neural network structures including recurrent neural networks (RNN) and autoencoders (AE).

Research Interests

Dynamic Decision Processes; Integer Programming; Reinforcement Learning; Human Behavior Modeling; Time Series Modeling

Publications

Qiu, H. (2018). An Inattention Model for Traveler Behavior with e-Coupons. *Available at SSRN 3305753.*

Qiu, H., Lam, H. T., Fusco, F., & Sinn, M. (2018). Learning Correlation Space for Time Series. *arXiv preprint arXiv:1802.03628.*

Qiu, H., Li, R., & Zhao, J. (2018). Dynamic pricing in shared mobility on demand service. *arXiv preprint arXiv:1802.03559*.

Qiu, H., Li, R., & Liu, H. (2016). Integrated model for traffic flow forecasting under rainy conditions. *Journal of Advanced Transportation*.

Working Papers

Zhang, H., Guo, X., **Qiu, H.**, Renda, M. E., & Zhao, J. Mobility Sharing with Time Flexibility.

Conference Presentations

Qiu, H., Li, R., & Zhao, J. (2018). Daily Level Dynamic Pricing in Shared Mobility on Demand Service. In *Transportation Research Board 2018 Annual Meeting* (No. 18-00723).

Academic Experience

Massachusetts Institute of Technology, Cambridge, MA, USA

Graduate Student **September, 2015 - June, 2017**

Includes master-level coursework and research projects, with a focus on discrete-choice-based estimation and optimization.

- Dynamic pricing in shared mobility-on-demand services: applied a single-period optimal pricing algorithm and evolution strategy (ES) methods to solve for near-optimal pricing strategies in a multi-period utility-maximization problem, under the assumption that the traveler choice behavior follows the multinomial logit choice model
- Assortment optimization under logit mixture models: developed heuristics to find the operator's profit-maximizing route choice set under the assumption that the traveler choice behavior follows the logit mixture model

Research Assistant

Intelligent transportation systems (ITS) Lab **September, 2015 - June, 2016**

Participated in the development of simulation systems for the Flexible Mobility on Demand (FMOD) and the SimMobility projects.

Teaching Assistant

15.093 Optimization Methods **September, 2016 - January, 2017**

Graded assignments and exams, and answered students' questions during office hours.

Tsinghua University, Beijing, China

Research Assistant **January, 2014 - July, 2015**

Includes several research projects in the fields of transportation and operation research.

- Assortment problem under d-level nested logit models: designed both a fully polynomial-time approximation scheme (FPTAS) and an efficient heuristic to solve the assortment problem under certain regularity conditions on dissimilarity parameters and preference weights
- Traffic flow forecasting under rainy conditions: applied linear regressions to correct the effects of precipitations and improved the forecasting accuracy under rainy scenarios

Education

Massachusetts Institute of Technology, Cambridge, MA, USA

M.S., Transportation, June, 2017

Tsinghua University, Beijing, China

B.E., Civil Engineering, June, 2015
B.S., Pure and Applied Mathematics, June, 2015

Computer Skills

- Machine Learning & Deep Learning Package/Framework: TensorFlow, XGBoost.
- Programming Languages: Python, scala, julia, C++.
- Optimization Software: Gurobi, CLP/CBC.
- General Purpose Applications: LaTeX, Git.