詹仙园

个人简历

联系方式 北京市亦庄开发区科创 11 街京东集团总部 A 座 12F 电话: +86 -13041201050
京东智能城市研究院 E-mail: zhanxianyuan@gmail.com

研究方向 深度强化学习，交通大数据挖掘与建模，城市计算，复杂系统控制优化，复杂网络

教育背景

美国普渡大学 交通工程博士 2013/01 – 2017/08
导师：Satish V. Ukkusuri 教授

美国普渡大学 计算机科学硕士 2014/01 – 2016/12

美国普渡大学 交通工程硕士 2011/08 – 2012/12

清华大学 土木工程学士 2007/08 – 2011/07

工作经验

数据科学家，资深研究员 2018/01 – 至今
京东数科-京东智能城市事业部，京东智能城市研究院

副研究员 2017/08 – 2018/01
微软亚洲研究院，城市计算组，北京

研究助理 2011/08 – 2017/08
美国普渡大学土木工程系

客座研究员 2015/05 – 2015/08
微软亚洲研究院，北京

研究助理 2009/01 – 2011/01
清华大学地理信息系统、遥感、全球定位系统研究中心

助理工程师 (实习) 2010/06 – 2010/09
北京建工集团

荣誉及奖项

- 2019 机器之心人工智能年度奖项三十大最佳 AI 应用案例 2020
- 中国计算机学会人工智能及模式识别（CCF-AI）专委会委员 2018
- 2018 年中国人工智能峰会（CAIS2018）创新奖 2018
- James S. McDonnell Foundation (JSMF) Postdoctoral Fellowship Award in Studying Complex Systems 2016
- 普渡大学 Pai Tao Yeh 奖学金（两次） 2013，2014
- 第五届全国大学生交通科技大赛二等奖 2010
- 清华大学郑格如奖学金 2009
- 清华大学金门奖学金（两次） 2008，2010

发表文章

共发表国际期刊论文 22 篇，会议论文 8 篇，书籍章节 2 篇，已授权发明专利 3 项。
Google Citation 1000+，H-index 14。

期刊

1. **Zhan, X.**, Li, R., and Ukkusuri, S. V., 2020. Traffic State Estimation for Arterial Networks Using License-plate Recognition Data. *Transportation Research Part C: Emerging Technologies*, 117, 102660.
2. Yang, C., Zhang, Y., **Zhan, X.**, Ukkusuri, S. V. and Chen, Y., 2020. Fusing Mobile Phone and Travel Survey Data to Model Urban Activity Dynamics. Accepted in *Journal of Advanced Transportation*.
3. **Zhan, X.**, and Ukkusuri, S. V., 2019. Spatial Dependency of Urban Sprawl and the Underlying Road Network Structure. *Journal of Urban Planning and Development*, 145(4), 04019014.
4. Zischg, J., Klinkhamer, C., **Zhan, X.**, Rao, S. C., and Sitzenfrei, R., 2019 A Century of Topological Co-Evolution of Complex Infrastructure Networks in an Alpine City. *Complexity*, 2019, 2096749.

5. Gehlot, H., **Zhan, X.**, Qian, X., Thompson, C., Kulkarni, M. and Ukkusuri, S. V., 2018. A-Rescue 2.0: A High Fidelity, Parallel, Agent-based Evacuation Simulator. *Journal of Computing in Civil Engineering*, 33(2), 04018059.
6. **Zhan, X.**, Ukkusuri, S. V., and Rao, S. C., 2017. Dynamics of Functional Failures and Recovery in Complex Road Networks. *Physical Review E*, 96(5), 052301.
7. **Zhan, X.**, and Ukkusuri, S. V., 2017. Multiclass, Simultaneous Route and Departure Time Choice Dynamic Traffic Assignment with an Embedded Spatial Queuing Model. *Transportmetrica B: Transport Dynamics*, doi: 10.1080/21680566 .2017.1354738.
8. Mo, B., Li, R., **Zhan, X.**, 2017. Speed Profile Estimation Using License Plate Recognition Data. *Transportation Research Part C: Emerging Technology*, 82, 358–378.
9. Kreuger, E., Klinkhamer, C., Urich C., **Zhan, X.**, and Rao, S. C., 2017. Generic Patterns in the Evolution of Urban Water Networks: Evidence from a Large Asian City. *Physical Review E*, 95(3), 032312.
10. Li, R. Ye, Z., Li. B. and **Zhan, X.**, 2017. Simulation of Hard Shoulder Running Combined with Queue Warning During Traffic Accident with CTM model. *IET Intelligent Transport Systems*, 11(9), 553-560.
11. **Zhan, X.**, Zheng, Y., Yi, X., and Ukkusuri, S. V., 2016. Citywide Traffic Volume Estimation Using Trajectory Data. *IEEE Transactions on Knowledge and Data Engineering (TKDE)*, 29(2), 272-285.
12. **Zhan, X.**, Qian, X., Ukkusuri, S. V., 2016. A Graph Based Approach to Measure the Efficiency of Urban Taxi Service System. *IEEE Transactions on Intelligent Transportation Systems*, 17(9), 2479-2489.
13. **Zhan, X.**, Ukkusuri, S., V., Yang, C., 2016. A Bayesian Mixture Model for Short-term Average Link Travel Time Estimation Using Large-scale Limited Information Trip-based Data. *Automation in Construction*, 72(3), 237-246.
14. Mesa-Arango, R., **Zhan, X.**, Ukkusuri, S. V., Mitra, A., 2016. Direct Transportation Economic Impacts of Highway Networks Disruptions Using Public Data from United States. *Journal of Transportation Safety & Security*, 8(1), 36-55.
15. Hasan, S., Ukkusuri, S., **Zhan, X.**, 2016. Understanding Social Influence in Activity-Location Choice and Life-Style Patterns Using Geo-location Data from Social Media. *Frontiers in ICT*, 3:10, doi: 10.3389/fict.2016.00010.
16. Aziz, H. M., Ukkusuri, S., **Zhan, X.**, 2016. Determining the Impact of Personal Mobility Carbon Allowance Schemes in Transportation Networks. *Network and Spatial Economics*, 17(2), 505-545.
17. Ukkusuri, S., Hasan, S., Doan, K., Luong, B., **Zhan, X.**, Murray-Tuite, P., Yin, W., 2016. A-RESCUE: An Agent-based Regional Evacuation Simulator Coupled with User Enriched Behavior. *Network and Spatial Economics*, 17(1), 197-223.
18. **Zhan, X.**, Aziz, H. M., Ukkusuri, S. V., 2015. An Efficient Parallel Sampling Technique for Multivariate Poisson-Lognormal Model: Analysis with Two Crash Count Datasets. *Analytic Methods in Accident Research*, 8, 45-60.
19. **Zhan, X.**, Li, R., Ukkusuri, S. V., 2015. Lane-based Real Time Queue Length Estimation Using License Plate Recognition Data. *Transportation Research Part C: Emerging Technology*, 57, 85-102.
20. **Zhan, X.**, Ukkusuri, S., V., Zhu, F., 2014. Inferring Urban Land Use Using Large-Scale Social Media Check-in Data. *Network and Spatial Economics*, 14, 647-667.
21. **Zhan, X.**, Hasan, S., Ukkusuri, S. V., Kamga, C., 2013. Urban Link Travel Time Estimation Using Large-scale Taxi Data with Partial Information. *Transportation Research Part C: Emerging Technologies*, 33, 37-49.
22. Ukkusuri, S., **Zhan, X.**, Sadri A., Ye, Q., 2013. Exploring Crisis Informatics Using Social Media

Data: A Study on 2013 Oklahoma Tornado. *Transportation Research Record*, 2459, 110-118..

书籍章节

1. Qian, X, **Zhan, X.**, Ukkusuri, S. V. Characterizing Urban Dynamics Using Large Scale Taxicab Data. *Engineering and Applied Sciences Optimization*: Vol. 38, 17-32, Springer International Publishing, 2015.
2. Ukkusuri, S. V., Hasan, S., and **Zhan, X.** Checking the Urban Pulse: Social Media Data Analytics for Transportation Applications. *Best Practices for Transportation Agency Use of Social Media* Data. Taylor and Francis/CRC Press, 2013.

会议论文

1. Yang, C., Zhang, Y., **Zhan, X.**, Ukkusuri, S. V., and Qiu, W. Activity Chain Inference Using Travel Survey and Mobile Phone data. In *Proceedings of Transportation Research Board Meeting*, Washington D.C., January 2017.
2. Zischg, J., Klinkhamer, C., **Zhan, X.**, Krueger, E., Ukkusuri, S., Rao, P. S. C., Rauch, W. and Sitzenfrei, R. Evolution of Complex Network Topologies in Urban Water Infrastructure. In *World Environmental and Water Resources Congress* 2017, 648-659.
3. **Zhan, X.**, Ukkusuri, S. V. A Probabilistic Urban Link Travel Time Estimation Model Using Large-scale Taxi Trip Data. I*n Proceedings of 94th Transportation Research Board Meeting*, Washington D.C., January 2015.
4. **Zhan, X.**, Qian, X., Ukkusuri, S. V. Measuring the Efficiency of Urban Taxi Service System. In *Proceedings of 94th Transportation Research Board Meeting*, Washington D.C., January 2015.
5. Qian, X., **Zhan, X.**, Ukkusuri, S. Characterizing Urban Dynamics Using Large Scale Taxicab Data. I*n Proceedings of 93nd Transportation Research Board Meeting*, Washington D.C., January 2014.
6. **Zhan, X.**, Ukkusuri, S. V.. Multi-User Class, Simultaneous Route and Departure Time Choice Dynamic Traffic Assignment with an Embedded Spatial Queuing Model. *Presented at 5th International Symposium on Dynamic Traffic Assignment*. Salerno, Italy, June, 2014.
7. Hasan, S., **Zhan, X.**, and Ukkusuri, S. V. Understanding Urban Human Activity Patterns Using Large-scale Location-based Data from Online Social Media. *Proceedings of the 2nd ACM SIGKDD International Workshop on Urban Computing*, 2013.
8. Hasan, S., **Zhan, X.**, and Ukkusuri, S. V. Understanding Urban Human Activity and Mobility Patterns Using Large-scale Location-based Data from Online Social Media. I*n Proceedings of 92nd Transportation Research Board Meeting*, Washington D.C., January 2013.

ARXIV 论文

1. Klinkhamer, C., Kreuger, E., **Zhan, X.**, Blumesaat, F., Ukkusuri, S. V., and Rao, S. C. Functionally Fractal Urban Networks: Geospatial Co-location and Homogeneity of Infrastructure. arXiv preprint arXiv:1712.03883.

在审论文

1. Qin, H., **Zhan, X.**, Zheng, Y. CSCAD: Correlation Structure-based Collective Anomaly Detection in Complex System. Submitted to *IEEE Transactions on Knowledge and Data Engineering (TKDE)*.
2. Xu, H., **Zhan, X.**, Li, C., and Zheng, Y. CEQ: Constraint Evaluation Q-Learning for Offline Reinforcement Learning under Constraints. Submitted to *Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI2021)*.
3. Qin, H., Ke, S., Yang, X., Xu, H., **Zhan, X.**, and Zheng, Y. Robust Spatio-Temporal Purchase Prediction via Deep Meta Learning. Submitted to *Thirty-Fifth AAAI Conference on Artificial Intelligence (AAAI2021)*.

毕业论文

1. Novel Approaches to Model Congestion Evolution and Dependencies in Complex Road Networks. Ph.D. Dissertation, Purdue University, 2017.
2. Understanding the Aggregate Level Urban Activity Patterns Using Large-Scale Geo-Location Data. MS Thesis, Purdue University, 2012.
3. 基于元胞自动机的非常态交通流微观仿真研究。清华大学本科学位论文，2011。

已授权专利

1. 一种交叉口信号灯配时控制优化的方法和装置（CN110490132B, 2020/9/29）。
2. 数据处理方法和装置（CN 108805348B, 2020/6/23）。
3. 磨煤机的控制方法、装置、系统及储存介质（CN1106734788, 2020/9/29）。

主题演讲

1. Application of Deep Reinforcement Learning in Control Optimization of Thermal Power Plants. IEEE Services – Industry Symposium. October 2020.
2. Urban Computing: Building Intelligent Cities with Big Data and AI. Invited talk at Tsinghua University. November 2019, Beijing, China.
3. Data-driven Methods in Urban Applications: New Problems, New Directions and New Approaches. Invited talk at Tsinghua University. December 2018, Beijing, China.
4. Spatio-Temporal Deep Learning in Intelligent Cities. Smart Cities and Urban Computing Forum, China National Computer Congress (CNCC 2018). October 2018, Hangzhou.
5. Data-driven Optimization Models for Logistics in Urban Applications. 3rd Workshop on Applications of the Mathematical Modeling in Enterprises. July 2018, University of Chinese Academy of Sciences, Beijing.
6. Data-driven Methods in Urban Transportation Applications. Invited talk at Tsinghua University. September 2017, Beijing, China.
7. A Vertex Split-Recovery Model for Congestion Evolution Process on Road Networks. INFORMS 2016. November 2016, Nashville.
8. Traffic State Estimation for Arterial Networks Using License-plate Recognition Data. INFORMS 2016. November 2016, Nashville.
9. A Node Split-Recovery Model for Congestion Evolution Process on Road Networks. Resilience Week 2016. August 2016, Chicago.
10. A Node Splitting-Recovery Model for Congestion Evolution Process on Road Networks. 4th International Symposium on Water, Feedbacks, and Complexity. March 2016, Purdue University.
11. A Bayesian Mixture Model for Short-term Average Link Travel Time Estimation Using Large-scale Limited Information Trip-based Data. INFORMS 2015, November 2016, Philadelphia.
12. A Graph-based Approach to Measure the Efficiency of Urban Taxi Service System. INFORMS 2015, November 2015, Philadelphia.
13. Measuring the Efficiency of Urban Taxi Service System. KDD 2014 International Workshop on Urban Computing, August 2014, New York.
14. Urban Link Travel Time Estimation Using Large-scale Taxi Data with Partial Information. MPE 2013+ Workshop on Sustainable Human Environments. April 2014, Rutgers University.
15. Multiclass Dynamic User Equilibrium with a Path Based Cell Transmission Model for General Traffic Networks. INFORMS 2013, October 2013, Minneapolis.
16. Real Time Link Travel Time Estimation Using License-plate Recognition Data. INFORMS 2013, October 2013, Minneapolis.

合作研究项目

- **基于数据驱动及深度强化学习的交通信号优化模型** 2017 -2018
  与滴滴出行合作，已获得一项授权专利。
- **基于海量轨迹数据的城市范围道路车流量估计** 2015 - 2016
  与微软亚洲研究院合作，发表一篇期刊论文(IEEE TKDE)。
- **基于车牌识别数据的主干道实时车辆排队长度估计** 2014 - 2015
  与清华大学合作，发表一篇期刊论文(TR-Part C)。
- **The Use of Large-scale Dataset for Understanding Network State** 2013
  与 City College of New York (CUNY) 合作，发表一篇期刊论文(TR-Part C)。

研究项目

- **基于人工智能的火电机组控制优化系统研究** 2018 - 2020
  由京东智能城市研究院及国家能源集团提供试点科研项目支撑。

主导研发了基于深度强化学习算法的 AI+火力发电控制优化系统，并实现产品化落地，帮助火电机组提升锅炉燃烧效率，降低污染物排放。系统已成功落地国内三家电厂。 2018

- **大规模复杂系统异常检测算法研究**
  由京东智能城市研究院及国家能源集团提供试点科研项目支撑。
  研发完成针对大规模复杂工业、能源系统的全新异常检测算法，一篇相关论文在审（IEEE TKDE）。 2015 – 2017
- **Bridging Information, Uncertainty and Decision-Making in Hurricanes Using an Interdisciplinary Perspective**
  美国国家自然科学基金（NSF）支撑。
  项目核心骨干，带领研发团队开发针对飓风撤离场景下的大规模并行化交通模拟仿真器，发表一篇期刊论文（Journal of Computing in Civil Engineering）。 2012 - 2015
- **Incorporating Household Decision Making with Dynamic Transportation Modeling in Hurricane Evacuation**
  美国国家自然科学基金（NSF）支撑。
  参与开发针对飓风撤离场景下的 Agent-based 大规模交通模拟仿真器（A-RESCUE），发表一篇期刊论文（Network and Spatial Economics）。

专业期刊及会议审稿人

期刊

1. PLOS ONE
2. ACM Transactions on Intelligent Systems and Technology
3. IEEE Transactions on Knowledge and Data Engineering (TKDE)
4. IEEE Transactions on Big Data (TBD)
5. IEEE Transactions on Knowledge Discovery from Data (TKDD)
6. IEEE Transactions on Intelligent Transportation Systems (ITS)
7. IEEE Access
8. Expert Systems With Applications
9. Transportation Research Part B: Methodological
10. Transportation Research Part C: Emerging Technologies
11. Transportation Research Part D: Transport and Environment
12. Transportmetrica B: Transport Dynamics
13. European Journal of Operational Research
14. Network and Spatial Economics
15. Transportation
16. Journal of Advanced Transportation
17. Environment and Planning B: Urban Analytics and City Science
18. IET Intelligent Transport Systems

会议

1. AAAI Conference on Artificial Intelligence
2. IEEE Conference on Decision and Control
3. Transportation Research Board Annual Meeting
4. China Conference on Data Mining (CCDM)

教学经验

- **在普渡大学的助教课程**
  1. CE 597: *The Science and Business of Logistics Systems* 2015 秋季学期
  2. CE 398: *Introduction to Civil Engineering System Design* 2013 春季学期

- **研讨会讲师:** 2015/06 – 07
  研讨会："Dynamics of Structure and Functions of Complex Networks",
  高丽大学，韩国首尔
- **指导本科交流学生:**
  1. 王靖兴，清华大学寒假交流本科生 2015/01 – 02
  2. 钱小东，清华大学暑期交流本科生 2013/07 – 09
  3. Victorial Mutran, 巴西 Universidade do Estado do Pará 暑期交流本科生 2012/07 – 09
- **指导实习生（微软亚洲研究院）:**
  1. 秦慧琳，西安电子科技大学博士生 2017 - 2018
- **指导实习生（京东智能城市研究院）:**
  1. 秦慧琳，西安电子科技大学博士生 2018 – 至今
  2. 徐浩然，西安电子科技大学硕士生 2018 – 至今
  3. 李一贤，东北大学硕士生 2018
  4. 李春阳，西安电子科技大学博士生 2019

实践经验

- 中国计算机学会人工智能及模式识别专委会（CCF-AI）委员 2018 – 至今
- 中国计算机学会（CCF）会员 2018 – 至今
- 普渡大学交通工程协会会员 2011 – 2017
- INFORMS 普渡大学分会会员 2013 – 2017
- 普渡大学清华校友会副主席 2012 – 2014