Zhi Li

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Research Interest: Computational Interaction, Gaze-Based Interaction, Multi-Modal Interaction, Accessibility

Education

Stony Brook University, HCI Lab — Aug. 2018 – Present
Ph.D. in Computer Science, Advisor: Prof. Xiaojun Bi — *Stony Brook, NY*

Hangzhou Dianzi University, IoT Group — Sep. 2014 – Mar. 2017
M.E. in Computer Science, Advisor: Prof. Jianhui Zhang — *Hangzhou, China*

Hangzhou Dianzi University — Sep. 2010 – Jun. 2014
B.E. in Computer Science — *Hangzhou, China*

Publications (citations: 161, h-index: 7)

1. **Zhi Li**, Yu-Jung Ko, Aini Putkonen, Shirin Feiz, Vikas Ashok, IV Ramakrishnan, Antti Oulasvirta, Xiaojun Bi. "Modeling Touch-based Menu Selection Performance of Blind Users via Reinforcement Learning". In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (**CHI'23**). Hamburg, Germany. Apr 23 - 28, 2023. 1-18.
2. Wenzhe Cui*, Rui Liu*, **Zhi Li**, Yifan Wang, Andrew Wang, Xia Zhao, Sina Rashidian, Furqan Baig, IV Ramakrishnan, Fusheng Wang, Xiaojun Bi. "GlanceWriter: Writing Text by Glancing Over Letters with Gaze". In *Proceedings of the 2023 CHI Conference on Human Factors in Computing Systems* (**CHI'23**). Hamburg, Germany. Apr 23 - 28, 2023. 1-13. (*Co-First authors ordered alphabetically.)
3. Sophia Gu, Yan Ma, **Zhi Li**, Xiangmin Fan, Feng Tian, Xiaojun Bi. "Using Deep Learning to Detect Motor Impairment in Early Parkinson's Disease from Touchscreen Typing". In *Proceedings of Graphics Interface 2022* (**GI'22**). Montréal, Quebec. May 16 - 19, 2022. 209-217.
4. **Zhi Li**, Maozheng Zhao, Dibyendu Das, Hang Zhao, Yan Ma, Wanyu Liu, Michel Beaudouin-Lafon, Fusheng Wang, IV Ramakrishnan Xiaojun Bi. "Select or Suggest? Reinforcement Learning-based Method for High-Accuracy Target Selection on Touchscreens". In *Proceedings of the 2022 CHI Conference on Human Factors in Computing Systems* (**CHI'22**). New Orleans, LA, USA. Apr 29 - May 5, 2022. 1–15.
5. Maozheng Zhao, Henry Huang, **Zhi Li**, Rui Liu, Wenzhe Cui, Kajal Toshniwal, Ananya Goel, Andrew Wang, Xia Zhao, Sina Rashidian, Furqan Baig, Khiem Phi, Shumin Zhai, I.V. Ramakrishnan, Fusheng Wang, and Xiaojun Bi. "EyeSayCorrect: Eye Gaze and Voice Based Hands-free Text Correction for Mobile Devices". In *Proceedings of the 27th International Conference on Intelligent User Interfaces* (**IUI'22**). Online conference. Mar 21 - 25, 2022. 470-482.
6. **Zhi Li**, Maozheng Zhao, Yifan Wang, Sina Rashidian, Furqan Baig, Rui Liu, Wanyu Liu, Michel Beaudouin-Lafon, Brooke Ellison, Fusheng Wang, IV Ramakrishnan, Xiaojun Bi. "BayesGaze: A Bayesian Approach to Eye-Gaze Based Target Selection". In *Proceedings of Graphics Interface 2021* (**GI'21**). Online conference. May 27 - 28, 2021. 231-240.
7. Wenzhe Cui, Suwen Zhu, **Zhi Li**, Zheer Xu, Xing-Dong Yang, IV Ramakrishnan, Xiaojun Bi. "BackSwipe: Back-of-device Word-Gesture Interaction on Smartphones". In *Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems* (**CHI'21**). Online conference. May 8 - 13, 2021. 1-12.
8. Jianhui Zhang, Siwen Zheng, Tianhao Zhang, Mengmeng Wang, **Zhi Li**. "Charge-aware Duty Cycling Methods for Wireless Systems under Energy Harvesting Heterogeneity". *ACM Transactions on Sensor Networks*, 16(2), 1 - 23. 2020.
9. **Zhi Li**, Jianhui Zhang, Jiayu Gan, Pengqian Lu, Zhigang Gao, Wanzeng Kong. "Large-Scale Trip Planning for Bike-Sharing Systems". *Pervasive and Mobile Computing*, 54: 16 - 28, 2019.
10. Wei Li, Jianhui Zhang, Feilong Jiang, **Zhi Li**, Chong Xu. "Asynchronous Neighbor Discovery with Unreliable Link in Wireless Mobile Networks". *Peer-to-Peer Networking and Applications*, 12(3): 635-646, 2018.
11. Jianhui Zhang, Pengqian Lu, **Zhi Li**, Jiayu Gan. "Distributed Trip Selection Game for Public Bike System with Crowdsourcing". In *IEEE INFOCOM 2018 - IEEE Conference on Computer Communications* (**INFOCOM'18**). Honolulu, HI, USA. Apr 15 - 19, 2018. 2717-2725.
12. **Zhi Li**, Jianhui Zhang, Jiayu Gan, Pengqian Lu, Fei Lin. "Large-Scale Trip Planning for Bike-Sharing Systems". In *IEEE 14th International Conference on Mobile Ad Hoc and Sensor Systems* (**MASS'17**). Orlando, FL, USA. Oct 22 - 25, 2017. 328-332.

13. **Zhi Li**, Jianhui Zhang, Xingfa Shen, Jin Fan. "Prediction Based Indoor Fire Escaping Routing with Wireless Sensor Network". *Peer-to-Peer Networking and Applications*, 10(3): 697 - 707, 2017.
14. Jianhui Zhang, **Zhi Li**, Xiaojun Lin, Feilong Jiang. "Composite Task Selection with Heterogeneous Crowdsourcing". In *14th Annual IEEE International Conference on Sensing, Communication, and Networking* (**SECON'17**). San Diego, CA, USA. Jun 12 - 14, 2017. 1-9.
15. Jianhui Zhang, **Zhi Li**, Shaojie Tang. "Value of Information Aware Opportunistic Duty Cycling in Solar Harvesting Sensor Networks". *IEEE Transactions on Industrial Informatics*, 12(1): 348 - 360, 2016.
16. Jianhui Zhang, Mengmeng Wang, **Zhi Li**. "Stochastic Duty Cycling for Heterogenous Energy Harvesting Networks". In *IEEE 34th International Performance Computing and Communications Conference* (**IPCCC'15**). Nanjing, China. Dec 14 - 16, 2015. 1-9.
17. Jianhui Zhang, **Zhi Li**, Feng Xia, Shaojie Tang, Xingfa Shen, Bei Zhao. "Cooperative Scheduling for Adaptive Duty Cycling in Asynchronous Sensor Networks". *The Computer Journal*, 58(6): 1267 - 1279, 2014.

Selected Research Projects

EyeCanDo | *Homepage*, *App Store* Feb. 2020 – Present

Gaze-Based Interaction | Multi-Modal Interaction | Accessibility | ARKit ***CHI'23, IUI'22, GI'21***

- EyeCanDo is an assistive communication platform for people with motor disabilities based on multi-modal interaction (gaze, voice, brain-computer interface, and facial expression). It runs on iOS devices with a true-depth camera.
- Designed BayesGaze – a high performance gaze-based target selection method based on Bayesian Theorem. It improves target selection accuracy from 82.1% to 88.3% and selection time from 2.49 s to 2.23 s over the Dwell-based method.
- Implemented the GlanceWriter (CHI'23) on VR devices.

Modeling Menu Selection Behavior of People Who are Blind Apr. 2021 – Jan. 2023

User Behavior Modeling | Computational Rationality | Deep Reinforcement Learning | Accessibility ***CHI'23***

- Proposed a computational model to simulate how blind users select menu items using direct touch, gliding, swiping, and selection. Formulated the problem as a partially observable Markov Decision Process and solved it by Deep-Q Learning.
- The proposed model can simulate the menu selection behavior of the blind user and capture the effect of menu length and menu arrangement on menu selection time and the percentage of actions used by the users.

Target Selection on Small Touchscreen Devices Jan. 2021 – Feb. 2022

Touch-Based Interaction | Deep Reinforcement Learning ***CHI'22***

- Proposed a high-accuracy target selection method for small touchscreen devices (e.g. smartwatch). It automatically shows suggestions when the input is ambiguous and directly select the target when the input is certain. Formulated the selection process as a Markov Decision Process and solved it by Deep-Q Learning.
- User study results showed the proposed method outperforms 5 baselines in selection speed and accuracy.

Honor & Awards

- Outstanding Graduate Student in Zhejiang Province 2017
- Outstanding Graduate Student in Hangzhou Dianzi University 2017
- National Scholarship for Graduate Student (11/304, ranked 1st) 2016
- Nokia Scholarship for Graduate Student (2/147) 2015
- National Scholarship for Graduate Student (10/283, ranked 7th) 2015
- The First Prize Academic Scholarship, Hangzhou Dianzi University (Top 10%) 2015, 2016

Academic Services

Served as a reviewer for CHI (2021), UIST (2021, 2022), International Journal of Human-Computer Interaction, International Journal of Human-Computer Studies, IEEE Transactions on Industrial Informatics, Theoretical Computer Science, Computer Networks, International Journal of Ad Hoc and Ubiquitous Computing, The Computer Journal.

Technical Skills

Programming: **Java**, **Python**, Swift, C#, Matlab, SQL

Platform: **Android**, iOS, Unity

Library: Pytorch, Stable-Baselines3, Tensorflow, Scikit-learn, PyStan