Han Zou

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Contact

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Profile

Google Scholar
LinkedIn
ResearchGate

Research Interests

Internet of Things
Machine learning
Wireless Sensing
Ubiquitous Computing

Programming

Python
Matlab
C
Javascript

Demos

Demos on YouTube
IPS at UC Berkeley

Education

since 2017	**Postdoctoral Scholar** Electrical Engineering and Computer Sciences Advisor: Prof. Costas J. Spanos	University of California, Berkeley
2012–2016	**Ph.D.** Electrical and Electronic Engineering Advisor: Prof. Lihua Xie and Prof. Alexandre M. Bayen	Nanyang Technological University, Singapore
2008–2012	**B.Eng.** Electrical and Electronic Engineering **First Class Honours**	Nanyang Technological University, Singapore

Research Interests

My research interests include ubiquitous computing, machine learning and statistical learning with applications in occupancy sensing, indoor localization, Internet of Things (IoT), smart buildings and cyber-physical systems.

Experiences

Since 2017 — **Department of EECS, UC Berkeley** — Lead Researcher

Develop device-free occupancy sensing system with commodity WiFi IoT devices to realize fine-grained occupancy detection, counting and tracking in smart buildings.

Develop device-free wireless sensing system for human activity recognition, human identification and gesture recognition with commodity WiFi IoT devices for elderly healthcare and smart home automation.

Design deep learning and transfer learning algorithms to construct robust and adaptive classifiers for human identification, activity and gesture recognition.

2012 - 2016 — **Nanyang Technological University, Singapore** — Graduate Student Researcher

Designed a novel non-intrusive (no App installation) WiFi-based indoor positioning system (IPS) with a user-friendly web interface for reliable indoor navigation and real-time occupancy sensing.

Proposed 7 advanced localization algorithms to address longstanding challenges of IPS (e.g. device heterogeneity and environmental dynamics issues) for higher localization accuracy, reliability and efficiency.

Designed and prototyped a framework by integrating GPS (outdoor), iBeacon (semi-outdoor) and WiFi (indoor) for accurate indoor-outdoor detection with fast-response, and seamless navigation in all environments.

2012 - 2016 — **Berkeley Education Alliance for Research in Singapore** — Lead Researcher

Deployed and Implemented the proposed IPSs in 11 distinct indoor environments with 95000 ft^2 in U.S.A., Singapore, Taiwan and Germany.

Realized seamless indoor navigation services for customers with optimal path guidance on mobile devices and wearable devices (e.g. Google Glass).

Developed an indoor geo-fencing platform for occupancy adaptive lighting and air-conditioning system in the smart home and smart buildings.

Publications: Journals

2017   **WinIPS: WiFi-Based Non-Intrusive Indoor Positioning System with Online Radio Map Construction and Adaptation**
Han Zou, Ming Jin, Hao Jiang, Lihua Xie, Costas Spanos
IEEE Transactions on Wireless Communications (IF=4.951)

2016   **A Robust Indoor Positioning System based on the Procrustes Analysis and Weighted Extreme Learning Machine**
Han Zou, Baoqi Huang, Xiaoxuan Lu, Hao Jiang, Lihua Xie
IEEE Transactions on Wireless Communications (IF=4.951)

2018   **WinLight: A WiFi-based Occupancy-driven Lighting Control System for Smart Building**
Han Zou, Yuxun Zhou, Hao Jiang, Szu-Cheng Chien, Lihua Xie, Costas Spanos
Energy and Buildings (IF=4.067)

2017   **Non-intrusive Occupancy Sensing in Commercial Buildings**
Han Zou, Hao Jiang, Jianfei Yang, Lihua Xie, Costas Spanos
Energy and Buildings (IF=4.067)

2016   **BlueDetect: An iBeacon-Enabled Scheme for Accurate and Energy-Efficient Indoor-Outdoor Detection and Seamless Location-Based Service**
Han Zou, Hao Jiang, Yiwen Luo, Janjie Zhu, Xiaoxuan Lu, Lihua Xie
Sensors (IF=2.677)

2015   **A Fast and Precise Indoor Localization Algorithm based on an Online Sequential Extreme Learning Machine**
Han Zou, Xiaoxuan Lu, Hao Jiang, Lihua Xie
Sensors (IF=2.677)

2016   **Robust Extreme Learning Machine with its Application to Indoor Positioning**
Xiaoxuan Lu, **Han Zou**, Hongming Zhou, Lihua Xie, Guang-Bin Huang
IEEE Transactions on Cybernetics (IF=7.384)

2015   **Fusion of WiFi, Smartphone Sensors and Landmarks using the Kalman Filter for Indoor Localization**
Zhenghua Chen, **Han Zou**, Hao Jiang, Qingchang Zhu, Yeng Chai Soh, Lihua Xie
Sensors (IF=2.677)

2016   **MapSentinel: Can the Knowledge of Space Use Improve Indoor Tracking Further?**
Ruoxi Jia, Ming Jin, **Han Zou**, Yigitcan Yesilata, Lihua Xie, Costas Spanos
Sensors (IF=2.677)

2017   **SugarMate: Non-intrusive Blood Glucose Monitoring with Smartphones**
Weixi Gu, Yuxun Zhou, Zimu Zhou, Xi Liu, **Han Zou**, Pei Zhang, Costas Spanos, Lin Zhang
ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies

2014   **Platform and Algorithm Development for a RFID-based Indoor Positioning System**
Han Zou, Lihua Xie, Qing-Shan Jia, Hengtao Wang
Unmanned Systems

2018   **Device-Free Human Activity Recognition in Smart Buildings via Automatic Kernel Representation Learning**
Han Zou, Yuxun Zhou, Jianfei Yang, Lihua Xie, Costas Spanos
submitted to IEEE Transactions on Industrial Electronics (IF=7.168)

2018   **Device-Free Occupancy Detection and Crowd Counting in Smart Buildings with WiFi-enabled IoT**
Han Zou, Yuxun Zhou, Jianfei Yang, Lihua Xie, Costas Spanos
submitted to Energy and Buildings (IF=4.067)

Publications: Conference

2018 **WiFi-based Human Identification via Convex Tensor Shapelet Learning** AAAI
Han Zou, Yuxun Zhou, Jianfei Yang, Weixi Gu, Lihua Xie, Costas Spanos
AAAI Conference on Artificial Intelligence (**AAAI**)

2018 **Non-Parametric Outliers Detection in Multiple Time Series A Case Study: Power Grid Data Analysis** AAAI
Yuxun Zhou, **Han Zou**, Reza Arghandeh, Weixi Gu, Costas Spanos
AAAI Conference on Artificial Intelligence (**AAAI**)

2018 **DeepSense: Device-free Human Activity Recognition via Autoencoder Long-term Recurrent Convolutional Network** ICC
Han Zou, Yuxun Zhou, Jianfei Yang, Hao Jiang, Lihua Xie, Costas Spanos
IEEE International Conference on Communications (**ICC**)

2017 **Multiple Kernel Representation Learning for WiFi-based Human Activity Recognition**
ICMLA
Han Zou, Yuxun Zhou, Jianfei Yang, Weixi Gu, Lihua Xie, Costas Spanos
IEEE International Conference On Machine Learning And Applications (**ICMLA**)

2017 **FreeCount: Device-Free Crowd Counting with Commodity WiFi** GLOBECOM
Han Zou, Yuxun Zhou, Jianfei Yang, Weixi Gu, Lihua Xie, Costas Spanos
IEEE Global Communications Conference (**GLOBECOM**)

2017 **Adaptive Localization in Dynamic Indoor Environments by Transfer Kernel Learning**
WCNC
Han Zou, Yuxun Zhou, Hao Jiang, Baoqi Huang, Lihua Xie, Costas Spanos
IEEE Wireless Communications and Networking Conference (**WCNC**)

2016 **Consensus-Based Parallel Extreme Learning Machine for Indoor Localization** GLOBECOM
Han Zou, Zhirong Qiu, Hao Jiang, Lihua Xie, Yiguang Hong
IEEE Global Communications Conference (**GLOBECOM**)

2016 **Standardizing Location Fingerprints Across Heterogeneous Mobile Devices for Indoor Localization** WCNC
Han Zou, Baoqi Huang, Xiaoxuan Lu, Hao Jiang, Lihua Xie
IEEE Wireless Communications and Networking Conference (**WCNC**)

2017 **WiFi-based Device-Free Human Activity Recognition via Automatic Representation Learning: Poster** MobiCom
Han Zou, Yuxun Zhou, Jianfei Yang, Weixi Gu, Lihua Xie, Costas Spanos
ACM International Conference on Mobile Computing and Networking (**MobiCom**)

2016 **A Transfer Kernel Learning Based Strategy for Adaptive Localization In Dynamic Indoor Environments: Poster** MobiCom
Han Zou, Yuxun Zhou, Hao Jiang, Baoqi Huang, Lihua Xie, Costas Spanos
ACM International Conference on Mobile Computing and Networking (**MobiCom**)

2016 **WinIPS: WiFi-based Non-intrusive IPS for Online Radio Map Construction** INFOCOM Workshop
Han Zou, Ming Jin, Hao Jiang, Lihua Xie, Costas Spanos
IEEE International Conference on Computer Communications Workshops (**INFOCOM Workshops**)

2017 **Freedetector: Device-free Occupancy Detection with Commodity WiFi** SECON
Han Zou, Yuxun Zhou, Jianfei Yang, Weixi Gu, Lihua Xie, Costas Spanos
IEEE International Conference on Sensing, Communication and Networking (**SECON Workshops**)

2017 **Accurate Indoor Localization and Tracking Using Mobile Phone Inertial Sensors, WiFi and iBeacon** INERTIAL
Han Zou, Zhenghua Chen, Hao Jiang, Lihua Xie, Costas Spanos
IEEE International Symposium on Inertial Sensors and Systems (**INERTIAL**)

2015 **A Mutual Information based Online Access Point Selection Strategy for WiFi Indoor Localization** CASE
Han Zou, Yiwen Luo, Xiaoxuan Lu, Hao Jiang, Lihua Xie
IEEE International Conference on Automation Science and Engineering (**CASE**)

2014 **An Online Sequential Extreme Learning Machine Approach to WiFi based Indoor Positioning** WF-IoT
Han Zou, Hao Jiang, Xiaoxuan Lu, Lihua Xie
IEEE World Forum on Internet of Things (**WF-IoT**)

2013 **An RFID Indoor Positioning System by using Weighted Path Loss and Extreme Learning Machine** CPSNA
Han Zou, Hengtao Wang, Lihua Xie, Qing-Shan Jia
IEEE International Conference on Cyber-Physical Systems, Networks, and Applications (**CPSNA**)

2018 **Fine-grained Adaptive Location-independent Activity Recognition using Commodity WiFi** WCNC
Jianfei Yang, **Han Zou**, Hao Jiang, Lihua Xie
IEEE Wireless Communications and Networking Conference (**WCNC**)

2014 **Indoor Occupant Positioning System using Active RFID Deployment and Particle Filters** DCOSS
Kevin Weakly, **Han Zou**, Lihua Xie, Qing-Shan Jia, Alex Bayen
IEEE International Conference on Distributed Computing in Sensor Systems (**DCOSS**)

2014 **Environmental Sensing by Wearable Device for Indoor Activity and Location Estimation**
IECON
Ming Jin, **Han Zou**, Kevin Weakly, Ruoxi Jia, Alex Bayen, Costas Spanos
Annual Conference of the IEEE Industrial Electronics Society

2016 **Robust Occupancy Inference with Commodity WiFi** WiMob
Xiaoxuan Lu, Hongkai Wen, **Han Zou**, Hao Jiang, Lihua Xie, Niki Trigoni
IEEE International Conference on Wireless and Mobile Computing, Networking and Communications (**WiMob**)

2016 **Exploiting Cyclic Features of Walking for Pedestrian Dead Reckoning with Unconstrained Smartphones** UbiComp
Baoqi Huang, Guodong Qi, Xiaokun Yang, Long Zhao, **Han Zou**
ACM International Joint Conference on Pervasive and Ubiquitous Computing (**UbiComp**)

Awards

2014	**Microsoft Indoor Localization Competition, 3rd Place**	Microsoft
2015	**Microsoft Indoor Localization Competition, 4th Place**	Microsoft
2012 - 2016	**SinBerBEST Graduate Scholarship**	National Research Foundation Singapore
2008 - 2012	**MOE Undergraduate Scholarship**	Ministry of Education Singapore
2008 - 2012	**Dean's List (Top 5%)**	Nanyang Technological University

Professional Services

- **Reviewer for:** IEEE/ACM Transactions on Networking, IEEE Transactions on Wireless Communication, Information Sciences, Energy and Buildings, IEEE Transactions on Cybernetics, IEEE Wireless Communications Letters, ACM IMWUT, IEEE GLOBECOM [2016], IEEE CASE [2015], IEEE ICCA [2014, 2016, 2017]

- **Technical Program Committee Member for:** IEEE GLOBECOM [2016], IEEE CASE [2015], IEEE ICCA [2014, 2016, 2017], SmartGridComm [2016]

- **Mentors of:** Xiaoxuan Lu - M.S. student at Nanyang Technological University (NTU) (now Ph.D. candidate at University of Oxford), Yiwen Luo - Undergraduate student at NTU (now software engineer at Amazon), Jianfei Yang - Ph.D. student at NTU