Shibo Zhang

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I am on the job market now. My research area is ***machine learning*** and ***human activity recognition***. I have experience in applying machine learning and deep learning techniques to help advance our ability to perceive human behaviors and facilitate human life. I am especially willing to attack the hardest and most challenging problems and make a difference in our lives. I am expected to graduate in the ***summer of 2021***.

Research Interests

Human Activity Recognition, Machine Learning, Deep Learning

Education

Ph.D., Computer Science, Northwestern University 2017 - 2021

M.S., Computer Science, Northwestern University 2015 - 2017

B.S., M.S., Electrical Engineering, Harbin Institute of Technology 2008 - 2014

Awards and Honors

Paper Awards

Best Poster Award, UbiComp (2%) 2020

Best Presentation Runner-up Award, UbiComp (1.3%) 2020

Distinguished Paper Award, UbiComp/IMWUT (3.7%) 2019

Best Paper Award, ACM BodyNets 2016

Outstanding Undergraduate Thesis Award (3%) 2012

Scholarships and Others

Student Travel Scholarship, NSF/Northwestern 2017, 2018

Best Intern Award, Eaton Corporate Research & Technology 2012, 2013

Eaton Innovation Scholarship, Undergraduate School 2012

Freescale Cup Autonomous Race Car Challenge, Regional Second Prize 2011

First-Class Scholarship, Undergraduate School 2008, 2009

Selected Projects

Deep Generative On-body Sensor Synthesis and Augmentation from Videos

○ Propose a deep generative cross-modal model to synthesize on-body sensor data from videos. Experiments conducted on public sensor-based activity recognition datasets illustrate the validity of the synthetic data.

○ Aims at expand on-body sensor dataset, by generating synthetic sensor data from video.

Sensor Fusion for Complex Activity Detection

○ Applied deep learning based multi-sensor (IMUs, respiration sensor, and GPS) fusion algorithms to detect daily activities including smoking and eating gestures in long-term wild settings.

○ Proposed a time synchronization method to resolve the clock-sync issue between wearable-camera and on-body accelerometer. Published a paper on top conference Ubicomp as a co-first author.

An Eating Detection Approach using a Multi-sensor Necklace

○ Proposed a multi-sensor necklace based two-stage eating detection approach. Applied a periodic peak detection algorithm in large volume of time series data, followed by gradient boosting algorithm to detect eating activity in free living setting. A density-based clustering method is then used towards eating episode recognition.

○ Published a first-author paper on top conference Ubicomp and won the Best Presentation Runner-up Award.

Machine Learning based Feeding Gesture Detection Using a Smartwatch

○ To detect overeating passively, a machine learning framework was designed to detect and accurately count the number of feeding gestures during an eating episode to characterize each eating episode.

○ Published a first-author paper on ACM BodyNets and won the Best Paper Award.

Publications

Please go to Google Scholar for a complete publication list.

Journal Papers

[1] SyncWISE: Window Induced Shift Estimation for Synchronization of Video and Accelerometry from Wearable Sensors
Yun C. Zhang*, **Shibo Zhang***, Miao Liu, Elyse Daly, Samuel Battalio, Santosh Kumar, Bonnie Spring, James M. Rehg, Nabil Alshurafa (* equal contribution)
Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. (IMWUT/UbiComp) 4.3 (Sept. 2020). 2020

[2] NeckSense: A Multi-Sensor Necklace for Detecting Eating Activities in Free-Living Conditions
Shibo Zhang, Yuqi Zhao, Dzung Tri Nguyen, Runsheng Xu, Sougata Sen, Josiah Hester, Nabil Alshurafa
Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. (IMWUT/UbiComp) 4.2 (June 2020). 2020

[3] Deep Learning Algorithms for Bearing Fault Diagnostics—A Comprehensive Review
Shen Zhang, **Shibo Zhang**, Bingnan Wang, Thomas. G. Habetler
IEEE Access 8 (2020) pp. 29857–29881. 2020

[4] micro-Stress EMA: A Passive Sensing Framework for Detecting In-the-wild Stress in Pregnant Mothers
Zachary D. King, Judith Moskowitz, Begum Egilmez, **Shibo Zhang**, Lida Zhang, Michael Bass, John Rogers, Roozbeh Ghaffari, Laurie Wakschlag, Nabil Alshurafa
Proc. ACM Interact. Mob. Wearable Ubiquitous Technol. (IMWUT/UbiComp) 3.3 (Sept. 2019). ACM, 2019

[5] I Sense Overeating: Motif-based Machine Learning Framework to Detect Overeating Using Wrist-worn Sensing
Shibo Zhang, William Stogin, Nabil Alshurafa
Information Fusion 41 (2018) pp. 37–47. 2018

Conference Papers

[1] Deep Generative Cross-modal On-body Accelerometer Data Synthesis from Videos (Doctoral Colloquium)
Shibo Zhang, Nabil Alshurafa
Adjunct Proceedings of the 2020 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2020 ACM International Symposium on Wearable Computers (UbiComp/ISWC '20 Adjunct), September 12–16, 2020, Virtual Event, Mexico, 2020

[2] VibroScale: Turning Your Smartphone into a Weighing Scale
Shibo Zhang, Qiuyang Xu, Sougata Sen, Nabil Alshurafa
Adjunct Proceedings of the 2020 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2020 ACM International Symposium on Wearable Computers (UbiComp/ISWC '20 Adjunct), September 12–16, 2020, Virtual Event, Mexico, 2020

[3] Multiscale Directional Fusion for Depth Map Super Resolution with Denoising
Dan Xu, Xiaopeng Fan, **Shibo Zhang**, Yang Wang, Debin Zhao, Wen Gao
2019 IEEE International Conference on Acoustics, Speech and Signal Processing (ICASSP), 2019

[4] Estimating Caloric Intake in Bedridden Hospital Patients with Audio and Neck-worn Sensors
Shibo Zhang, Dzung Nguyen, Gan Zhang, Runsheng Xu, Nikolaos Maglaveras, Nabil Alshurafa
2018 IEEE/ACM International Conference on Connected Health: Applications, Systems and Engineering Technologies (CHASE), 2018

[5] HABits Necklace: A Neck-worn Sensor That Captures Eating Related Behavior and More
Shibo Zhang, Dzung Nguyen, Zachary King, Jishnu Pradeep, Nabil Alshurafa

Proceedings of the 2018 ACM International Joint Conference and 2018 International Symposium on Pervasive and Ubiquitous Computing and Wearable Computers (UbiComp), 2018

[6] When Generalized Eating Detection Machine Learning Models Fail in the Field?
Shibo Zhang, Rawan Alharbi, Matthew Nicholson, Nabil Alshurafa
Proceedings of the 2017 ACM International Joint Conference on Pervasive and Ubiquitous Computing and Proceedings of the 2017 ACM International Symposium on Wearable Computers (UbiComp Workshops), 2017

[7] 🏆 Food Watch: Detecting and Characterizing Eating Episodes Through Feeding Gestures
Shibo Zhang, Rawan Alharbi, William Stogin, Mohamad Pourhomayun, Bonnie Spring, Nabil Alshurafa
Proceedings of the 11th EAI International Conference on Body Area Networks (BodyNets), 2016

Employment

Samsung Research America, Research Intern, Remote — Jan - Apr, 2021

Working on mobile health project.

OPPO Research Institute, Machine Learning Intern, Palo Alto, CA — Jul - Sep, 2019

Developed a physical model based optimization method for hand pose estimation.

DJI Technology Co., Intern, Shenzhen — Jul - Aug, 2015

Developed the control system for an automated vision-based ball-collecting quadrotor.

Eaton Corp., Global Research & Technology, Engineering & Leadership Trainee, Shanghai — 2014 - 2015

Eaton Corp., Global Research & Technology, Research Intern (thesis), Shanghai — 2012 - 2014

Academic Services

Journal Reviewer

Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (IMWUT)	2020
Journal of Biomedical and Health Informatics (JBHI)	2019, 2020
Journal of Medical Internet Research (JMIR)	2020
Journal of Vibration and Control (JVC)	2019, 2020
IEEE Access	2019, 2020

Conference Reviewer

24th ACM Conference on Computer-Supported Cooperative Work and Social Computing (CSCW)	2021
ACM CHI Conference on Human Factors in Computing Systems (CHI)	2021
The annual symposium on Computer-Human Interaction in Play (CHI PLAY)	2020
22nd ACM International Conference on Multimodal Interaction (ICMI)	2020
24th Annual International Symposium on Wearable Computers (ISWC)	2020
18th Annual IEEE Conference on Pervasive Computing and Communications (PerCom)	2020
IEEE-EMBS International Conference on Biomedical and Health Informatics (BHI)	2019

Teaching

Teaching Assistant

EECS 397/497 Wireless and Mobile Health (mHealth) — 2017, 2018

- Held office hours
- Designed programming homeworks, graded, assisted in course projects

Students Mentored

Qiuyang Xu (now NU undergraduate)	Jun - Sep, 2020
Fanfei Meng (now NU PhD student)	Jan - Jun, 2019
Ziwei Dong (now Emory PhD student)	Jun - Sep, 2018

Skills

Programming Language

Python (PyTorch, TensorFlow, Keras, Scikit-learn), Matlab, C/C++, R, bash, html, CSS, JavaScript

Tools

AWS, Git, Docker

References

Available upon request.