Zhongyang Zhang

Contact Information

PhD Student
Halıcıoğlu Data Science Institute
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Research Interests

Applied AI/ML, Event Camera-Based Vision (Dynamic Vision Sensor), Hyperspectral Imaging, Reinforcement Learning, Mobile Health, Digital Biomarker.

Education

Ph.D. in Halıcıoğlu Data Science Institute, University of California, San Diego
San Diego, CA, USA **Present**

- In progress.
- Advisor: Tauhidur Rahman (advisor)

Ph.D. in Manning College of Information & Computer Sciences, University of Massachusetts Amherst
Amherst, MA, USA **August 2022**

- Transferred to UCSD due to a lab relocation.
- Advisor: Tauhidur Rahman (advisor)
- GPA 3.84/4.0

Huazhong University of Science and Technology (HUST)
Wuhan, Hubei, China **June 2019**

- GPA 3.80/4.0
- Major: Electronic and Information Engineering.
- Thesis: "Deep reinforcement learning-based far-end crosstalk supressing in DDR5 RAM design"

Professional Experience

Graduate Research Assistant
University of California San Diego, San Diego, CA, USA **August 2022 to Present**

- Worked with Dr. Tauhidur Rahman on hyperspectral imaging and DVS imaging.

Graduate Research Assistant, Mobile Sensing and Ubiquitous Computing Lab
University of Massachusetts Amherst, Amherst, MA, USA **January 2020 to August 2022**

- Worked with Dr. Tauhidur Rahman on hyperspectral imaging and DVS imaging.

Team Leader, Hangzhou Pui Buy Technology Co. , Ltd.
Wuhan, Hubei, China **October 2017 to May 2018**

- Pui Buy Technology is a unicorn company and it owns the leading maternal and baby e-commerce platform in China.
- We build a customer service robot from scratch which is eventually deployed for commercial use.
- We clean and label the data, design an original model based on TextCNN and LSTM which supports online learning.

Japanese Language JLPT N1 Test Tutor, Huazhong University of Science and Technology
Wuhan, Hubei, China **September 2016 to June 2017**

Teaching Experience

Teaching Assistant
Mobile and Ubiquitous Computing (COMPSCI 590U) **Spring 2020**

- Location: University of Massachusetts, Amherst, MA
  - Designed template Android application for COVID monitoring.
  - Helped conduct lab tutorial on signal processing and machine learning for ubicomp.
  - Mentored students on their development of mobile applications.

Teaching Assistant
Embedded Computing Systems (COMPSCI 503) **Fall 2020**

- Location: University of Massachusetts, Amherst, MA
  - Designed new lecture material covering ARM instruction set architecture, data representation and analog electronics.
  - Advised students for their final projects.

Research Experience

Mobile Sensing and Ubiquitous Computing Lab, UMass Amherst
Research Assistant, Advisor: Prof. Tauhidur Rahman **January 2020 to Present**

- Hyperspectral Imaging System
  - Developed a meta-learning-based super-resolution algorithm for multispectral imagery.
  - Developed a recursive-style hyperspectral image super-resolution algorithm for merging satellite and drone images.
- Event camera-based Human Pose Estimation
  - Developed an event-based 3D human pose estimation system which works in realistic environments.
  - Two datasets are collected, including a synthetic dataset generated by an original simulator and a real-world dataset collected via human study. Also, a model suitable for this problem is proposed.
- Robust control in real time reinforcement learning using adaptive response times
  - Noticed the phenomenon that mammal usually response faster in emergency situation than usual, and developed a system which could do similar things.
  - Introduced early-exit into reinforcement learning and apply the algorithm to robot control problems.

Electromagnetic Compatibility (EMC) Laboratory, Missouri University of Science and Technology, Rolla, MO, USA
Visiting Scholar, Advisor: Prof. Jun Fan **July 2018 to June 2019**

- Solving Poisson's Equation using Deep Learning in Particle Simulation of PN Junction
  - Built an efficient Poisson's equation solver based on deep learning, which is applied in the dynamic simulation of the PN junction.
  - Designed and edge-aware loss that help improve the estimation accuracy on the edge, which decreased the accumulative error after iterations and resulted in better long-term matching.
- Decoupling capacitor selection algorithm for pdn based on deep reinforcement learning
  - Studied the method using reinforcement learning to optimize the selection and distribution of electronic components on PCB boards.
  - Developed a unique reinforcement learning environment which could evaluate the PCB layout using Matlab.
- Deep reinforcement learning-based far-end crosstalk supressing in DDR5 RAM design
  - Developed a reinforcement learning-based algorithm which could be used to supress the far-end crosstalk in DDR5 RAM design.

Publications

Refereed Conference and Journal Publications

[C5] Zhongyang Zhang, Kaidong Chai, Haowen Yu, Ramzi Majaj, Francesca Walsh, Edward

Wang, Hava Siegelmann, Donghyun Kim, Tauhidur Rahman. "YeLan: Event Camera-Based 3D Human Pose Estimation for Technology Mediated Dancing in Challenging Environments with Comprehensive Motion-to-Event Simulator" (Submitted to IMWUT 2023).

[C4] Adam S Grabell, Adrelys Mateo Santana, Kari N Thomsen, Katie Gonzalez, Zhongyang Zhang, Zachary Bivins, Tauhidur Rahman. "Prefrontal Modulation of Frustration-related Physiology in Preschool Children Ranging from Low to Severe Irritability" Developmental Cognitive Neuroscience, Volume 55, 2022.

[C3] Manasa Kalanadhabhatta, Adrelys Mateo Santana, Zhongyang Zhang, Deepak Ganesan, Adam S Grabell, Tauhidur Rahman. "EarlyScreen: Multi-scale Instance Fusion for Predicting Neural Activation and Psychopathology in Preschool Children" Proceedings of the ACM on Interactive, Mobile, Wearable and Ubiquitous Technologies (**IMWUT 2022**).

[C2] Ling Zhang, Zhongyang Zhang, Chenxi Huang, Han Deng, Hank Lin, Bin-Chyi Tseng, James Drewniak, Chulsoon Hwang. "Decoupling capacitor selection algorithm for pdn based on deep reinforcement learning" 2019 IEEE International Symposium on Electromagnetic Compatibility, Signal & Power Integrity (**EMC+ SIPI 2019**)

[C1] Zhongyang Zhang, Ling Zhang, Ze Sun, Nicholas Erickson, Ryan From, Jun Fan. "Solving Poisson's Equation using Deep Learning in Particle Simulation of PN Junction" 2019 Joint International Symposium on Electromagnetic Compatibility, Sapporo and Asia-Pacific International Symposium on Electromagnetic Compatibility (**EMC Sapporo/APEMC 2019**).

Workshop & Adjunct Publications
[W1] Zhongyang Zhang, Zhiyang Xu, Zia Ahmed, Asif Salekin, Tauhidur Rahman. "Hyperspectral Image Super-Resolution in Arbitrary Input-Output Band Settings" WACV 2022 Workshop on Applications of Computational Imaging) (**WACI 2022**).

Thesis
[D1] Zhongyang Zhang, "Deep reinforcement learning-based far-end crosstalk supressing in DDR5 RAM design", *B.Sc. Thesis, Huazhong University of Science and Technology*, 2019.

Student Volunteer
• IEEE Symposium on Electromagnetic Compatibility, Signal and Power Integrity, 2018

Membership IEEE

CITIZENSHIP Citizen of People's Republic of China on F-1 student visa