XIANZHONG DING

5200 N. Lake R., Merced, CA 95340

xding5@ucmerced.edu

SHORT BIOGRAPHY

Xianzhong Ding is a fourth-year Ph.D. student supervised by Prof. Wan Du in the Department of Computer Science and Engineering at the University of California, Merced (UCM). He is interested in Applied Machine Learning/Deep Learning, Optimization, and Edge Computing. He won the best paper runner-up award and best presentation award at BuildSys 2020. Before moving to Merced in 2018, he received his master's degree from Shandong University and bachelor's degree from Taishan University.

EDUCATION

University of California, Merced *August 2018 - present*
Ph.D. student in Electrical Engineering and Computer Science
Shandong University, China *August 2015 - June 2018*
M.S. student in Computer Science and Technology
Taishan University, China *August 2010 - June 2014*
B.S. student in Computer Science and Technology

PUBLICATIONS

1. [**Under Submission**] DRLIC : <u>D</u>eep <u>R</u>einforcement <u>L</u>earning for <u>I</u>rrigation <u>C</u>ontrol, **Xianzhong Ding** and Wan Du. 2021.

2. [**BuildSys'21**] Building Sensor Fault Detection and Diagnostic System, Devanshu Kumar, **Xianzhong Ding**, Wan Du and Alberto Cerpa, *ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, Coimbra, Portugal, November 2021.

3. [**BuildSys'20**] MB^{2}C : <u>M</u>odel-<u>B</u>ased deep reinforcement learning for <u>M</u>ulti-zone <u>B</u>uilding <u>C</u>ontrol, **Xianzhong Ding**, Wan Du, and Alberto Cerpa, *ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, Japan, November 2020. **Best Paper Runner-Up Award**, **Best Presentation Award**

4. [**ICDCS'20**] Continuous, Real-Time Object Detection on Mobile Devices without Offloading, Miaomiao Liu, **Xianzhong Ding**, Wan Du, *IEEE International Conference on Distributed Computing Systems*, Singapore, December 2020.

5. [**BuildSys'19**] OCTOPUS : Deep Reinforcement Learning for Holistic Smart Building Control, **Xianzhong Ding**, Wan Du, and Alberto Cerpa, *ACM International Conference on Systems for Energy-Efficient Buildings, Cities, and Transportation*, New York, November 2019.

6. [**LCTES'17**] Unified nvTCAM and sTCAM Architecture for Improving Packet Matching Performance, **Xianzhong Ding**, Zhiyong Zhang, Zhiping Jia, Lei Ju, Mengying Zhao, Huawei Huang, *ACM SIGPLAN / SIGBED Conference on Languages, Compilers, and Tools for Embedded Systems*, Barcelona, June 2017.

7. [**DAC'17**] Unified nvTCAM and sTCAM Architecture for Improving Packet Matching Performance, **Xianzhong Ding**, Zhiyong Zhang, Zhiping Jia, Lei Ju, Mengying Zhao, Huawei Huang, *Design Automation Conference*, Work in Progress, Austin, June 2017.

8. [**GRMSE'16**] Energy Efficient Routing Algorithm Using Software Defining Network for WSNs via Unequal Clustering, Hang Yu, Zhiping Jia, Lei Ju, Chunguang Liu, **Xianzhong Ding**, *International Conference on Geo-Informatics in Resource Management and Sustainable Ecosystems*, Shen Zhen, October 2016.

RESEARCH EXPERIENCE

1. Model-Based DRL for Multi-zone Building Control: Proposed a novel model-based Deep Reinforcement Learning (DRL) HVAC control system for multi-zone buildings. Developed a new building dynamics model as an ensemble of multiple environment-conditioned neural network models. Adopted a model predictive path integral control method to perform HVAC control. The proposed method can achieve 8.23% more energy savings compared to the state-of-the-art Model-based RL solution while maintaining similar thermal comfort. It can also reduce the training data set by an order of magnitude (10.52×) while achieving comparable performance to Model-Free RL approaches. Related publications include [3].

2. Real-Time Object Detection on Mobile Devices: Developed a mobile video processing system that achieves high detection accuracy in real-time on mobile devices without offloading. Proposed a parallel detection and tracking pipeline to fully utilize the computation resource on current mobile devices for high detection accuracy. Increased detection accuracy by adjusting the DNN model setting at runtime according to the variation of video content. The proposed method improves the accuracy of the state-of-the-art solution by up to 43.9%. Related publications include [4].

3. DRL for Holistic Smart Building Control: Leveraged DRL to balance the trade-off between energy use and human comfort in a holistic manner for smart building. Adopted a special reward function and a new DRL architecture to tackle the challenges imposed by the combined joint control of four subsystems with a very large action space. Tackled the issue of data training requirement by adopting a simulation strategy for data generation, and spending effort in calibrating the simulations to make them as close as possible to the target building. The proposed method can achieve 14.26% energy savings compared with the state-of-the-art rule-based method. Related publications include [5].

4. Improve Packet Matching Performance for TCAM: Study of the flow tables in Ternary Content Addressable Memory (TCAM) of SDN switch. Analyzed current drawbacks of Ternary Content Addressable Memory (TCAM) and proposed a unified nvTCAM and sTCAM system for Improving Packet Matching Performance. Designed a hybrid TCAM system and its Rule Migration Replacement Algorithm. The proposed method can achieve a 20.08% higher cache hit rate and a 19.52% lower update latency than TCAM with LRU replacement algorithm. Related publications include [6, 7].

HONORS AND REWARDS

Bobcat Summer Fellowship, EECS, UC Merced	*2021*
Best Paper Runner-Up Award at BuildSys 2020	*2020*
Best Presentation Award at BuildSys 2020	*2020*
Bobcat Summer Fellowship, EECS, UC Merced	*2020*
ACM SenSys 2019 NSF student travel grant	*2019*
Bobcat Summer Fellowship, EECS, UC Merced	*2019*
First level scholarship of Shandong University,	*2017 - 2018*
Third level scholarship for comprehensive performance, Shandong University	*2016 - 2017*
Scholarship for outstanding academic performance, Shandong University	*2015 - 2016*

SKILLS

Programming languages: Python, C/C++, Java
Deep learning framework: Tensorflow, Pytorch