

Ziwei Wang

✉ ziwei.wang@ntu.edu.sg • 🌐 ziweiwangthu.github.io

Working Experience

School of Electrical and Electronic Engineering, Nanyang Technological University <i>Assistant Professor</i>	2024-
Robotics Institute, Carnegie Mellon University <i>Postdoc Fellow with Prof. Changliu Liu</i>	2023-2024
Computer Science and Artificial Intelligence Laboratory, MIT <i>Research assistant with Prof. Edward Adelson</i>	2017

Education

Department of Automation, Tsinghua University PhD in Control Science and Engineering Advisor: Prof. Jiwen Lu	Beijing, China 2018-2023
Department of Physics, Tsinghua University B.S. in Maths and Physics	Beijing, China 2014-2018

Research Interests

Computer Vision, Machine Learning and Robotics

Publications

Peer-Reviewed Journal Publications

- [1] Xiuwei Xu, **Ziwei Wang**, Jie Zhou and Jiwen Lu
Back to Reality: Learning Data-Efficient 3D Object Detector with Shape Guidance
IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**), 2024
- [2] Zhenyu Wu, **Ziwei Wang**, Shengyu Liu, Hao Luo, Jiwen Lu, Haibin Yan
FairScene: Learning Unbiased Object Interactions for Indoor Scene Synthesis
Pattern Recognition (**PR**), 2024
- [3] Ruixuan Liu, Kangle Deng, **Ziwei Wang**, and Changliu Liu
StableLego: Stability Analysis of Block Stacking Assembly
IEEE Robotics and Automation Letters (**RAL**), 2024
- [4] **Ziwei Wang**, Han Xiao, Jie Zhou and Jiwen Lu
Learning Generalizable Mixed-Precision Quantization via Attribution Imitation
International Journal of Computer Vision (**IJCV**), 2024
- [5] Tianhao Wei, **Ziwei Wang**, Peizhi Niu, Abulikemu Abuduweili, Weiye Zhao, Casidhe Hutchison, Eric Sample, Changliu Liu
Improve Certified Training with Signal-to-Noise Ratio Loss to Decrease Neuron Variance and Increase Neuron Stability
Transactions on Machine Learning Research (**TMLR**), 2024
- [6] Jingyi Zhang, **Ziwei Wang**, Haoyu Wang, Jie Zhou and Jiwen Lu
Anycost Network Quantization for Image Super-Resolution
IEEE Transactions on Image Processing (**T-IP**), 2024
- [7] **Ziwei Wang**, Changyuan Wang, Xiuwei Xu, Jie Zhou and Jiwen Lu
Quantformer: Learning Extremely Low-precision Vision Transformers
IEEE Transactions on Pattern Analysis and Machine Intelligence (**T-PAMI**), 2023

- [8] **Ziwei Wang**, Jiwen Lu, Han Xiao, Shengyu Liu and Jie Zhou
Learning Accurate Performance Predictors for Ultrafast Automated Model Compression
International Journal of Computer Vision (IJCV), 2023
- [9] **Ziwei Wang**, Han Xiao, Yueqi Duan, Jie Zhou and Jiwen Lu
Learning Deep Binary Descriptors via Bitwise Interaction Mining
IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2023
- [10] Sichao Huang, **Ziwei Wang**, Jie Zhou and Jiwen Lu
Planning Irregular Object Packing via Hierarchical Reinforcement Learning
IEEE Robotics and Automation Letters (RAL), 2022
- [11] **Ziwei Wang**, Jiwen Lu, Ziyi Wu and Jie Zhou
Learning Efficient Binarized Object Detectors with Information Compression
IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2022
- [12] **Ziwei Wang**, Jiwen Lu, and Jie Zhou
Learning Channel-wise Interactions for Binary Convolutional Neural Networks
IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2021
- [13] Yueqi Duan, Jiwen Lu, **Ziwei Wang**, Jianjiang Feng and Jie Zhou
Learning Deep Binary Descriptor with Multi-Quantization
IEEE Transactions on Pattern Analysis and Machine Intelligence (T-PAMI), 2019

Peer-Reviewed Conference Publications

- [14] Tengbo Yu*, Guanxing Lu*, Zaijia Yang*, Haoyuan Deng, Si Chen, Jiwen Lu, Wenbo Ding, Guoqiang Hu, Yansong Tang, **Ziwei Wang**
ManiGaussian++: General Robotic Bimanual Manipulation with Hierarchical Gaussian World Model
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025
- [15] Zhenyu Wu, Xiuwei Xu, **Ziwei Wang**, Chong Xia, Linqing Zhao, Jiwen Lu, Haibin Yan
Anyview: Generalizable Indoor 3D Object Detection with Variable Frames
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025
- [16] Zhenyu Wu, **Ziwei Wang**, Xiuwei Xu, Jiwen Lu, Haibin Yan
Embodied Instruction Following in Unknown Environments
IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2025
- [17] Zhenyu Wu, Yuheng Zhou, Xiuwei Xu, **Ziwei Wang** and Haibin Yan
MoManipVLA: Transferring Vision-language-action Models for General Mobile Manipulation
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025
- [18] Yinan Liang, **Ziwei Wang**, Xiuwei Xu, Jie Zhou and Jiwen Lu
EfficientLLaVA: Generalizable Auto-Pruning for Large Vision-language Models
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025
- [19] Wenxuan Guo, Xiuwei Xu, **Ziwei Wang**, Jianjiang Feng, Jie Zhou and Jiwen Lu
Text-guided Sparse Voxel Pruning for Efficient 3D Visual Grounding
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR, Highlight), 2025
- [20] Hang Yin*, Xiuwei Xu*, Linqing Zhao, **Ziwei Wang**, Jie Zhou and Jiwen Lu
UniGoal: Towards Universal Zero-shot Goal-oriented Navigation
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2025
- [21] Guanxing Lu, **Ziwei Wang**, Changliu Liu, Jiwen Lu and Yansong Tang
ThinkBot: Embodied Instruction Following with Thought Chain Reasoning
The Thirteenth International Conference on Learning Representations (ICLR), 2025
- [22] Xiuwei Xu, Huangxing Chen, Linqing Zhao, **Ziwei Wang**, Jie Zhou and Jiwen Lu
EmbodiedSAM: Online Segment Any 3D Thing in Real Time
The Thirteenth International Conference on Learning Representations (ICLR, Oral), 2025

- [23] Changyuan Wang, **Ziwei Wang**, Xiuwei Xu, Yansong Tang, Jie Zhou and Jiwen Lu
Q-VLM: Post-training Quantization for Large Vision-Language Models
Thirty-eighth Conference on Neural Information Processing Systems (**NeurIPS**), 2024
- [24] Guanxing Lu, Shiyi Zhang, **Ziwei Wang**, Changliu Liu, Jiwen Lu and Yansong Tang
ManiGaussian: Dynamic Gaussian Splatting for Multi-task Robotic Manipulation
European Conference on Computer Vision (**ECCV**), 2024
- [25] Xiuwei Xu*, Zhihao Sun*, **Ziwei Wang**, Hongming Liu, Jie Zhou and Jiwen Lu
3D Small Object Detection with Dynamic Spatial Pruning
European Conference on Computer Vision (**ECCV**), 2024
- [26] Changyuan Wang, **Ziwei Wang**, Xiuwei Xu, Yansong Tang, Jie Zhou and Jiwen Lu
Towards Accurate Post-training Quantization for Diffusion Models
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR, Highlight**), 2024
- [27] Xiuwei Xu, Chong Xia, **Ziwei Wang**, Linqing Zhao, Yueqi Duan, Jie Zhou and Jiwen Lu
Memory-based Adapters for Online 3D Scene Perception
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2024
- [28] Linqing Zhao, Xiuwei Xu, **Ziwei Wang**, Yunpeng Zhang, Borui Zhang, Wenzhao Zheng, Dalong Du, Jie Zhou and Jiwen Lu
LowRankOcc: Tensor Decomposition and Low-Rank Recovery for Vision-based 3D Semantic Occupancy Prediction
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2024
- [29] Yinan Liang, **Ziwei Wang**, Xiuwei Xu, Yansong Tang, Jie Zhou and Jiwen Lu
MCUFormer: Deploying Vision Transformers on Microcontrollers with Limited Memory
Thirty-seventh Conference on Neural Information Processing Systems (**NeurIPS**), 2023
- [30] Xiuwei Xu, **Ziwei Wang**, Jie Zhou and Jiwen Lu
Binarizing Sparse Convolutional Networks for Efficient Point Cloud Analysis
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2023
- [31] Zhenyu Wu, **Ziwei Wang**, Jiwen Lu and Haibin Yan
Category-level Shape Estimation for Densely Cluttered Objects
IEEE International Conference on Robotics and Automation (**ICRA**), 2023
- [32] Quan Zheng, **Ziwei Wang**, Jie Zhou and Jiwen Lu
Shap-CAM: Visual Explanations for Convolutional Neural Networks based on Shapley Value
17th European Conference on Computer Vision (**ECCV**), 2022
- [33] Zhenyu Wu*, **Ziwei Wang***, Zibu Wei, Yi Wei and Haibin Yan
Smart Explorer: Recognizing Objects in Dense Clutter via Interactive Exploration
IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2022
- [34] Zhan Liu, **Ziwei Wang**, Sichao Huang, Jie Zhou and Jiwen Lu
GE-Grasp: Efficient Target-Oriented Grasping in Dense Clutters
IEEE/RSJ International Conference on Intelligent Robots and Systems (**IROS**), 2022
- [35] Han Xiao, **Ziwei Wang**, Zheng Zhu, Jie Zhou, and Jiwen Lu
Shapley-NAS: Discovering Operation Contribution for Neural Architecture Search
IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2022
- [36] **Ziwei Wang**, Han Xiao, Jiwen Lu and Jie Zhou
Generalizable Mixed-Precision Quantization via Attribution Rank Preservation
IEEE International Conference on Computer Vision (**ICCV**), 2021
- [37] **Ziwei Wang**, Yunsong Wang, Ziyi Wu, Jiwen Lu and Jie Zhou
Instance Similarity Learning for Unsupervised Feature Representation
IEEE International Conference on Computer Vision (**ICCV**), 2021

- [38] **Ziwei Wang**, Quan Zheng, Jiwen Lu and Jie Zhou
Deep Hashing with Active Pairwise Supervision
European Conference on Computer Vision (ECCV), 2020
- [39] **Ziwei Wang**, Ziyi Wu, Jiwen Lu and Jie Zhou
BiDet: An Efficient Binarized Object Detector
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2020
- [40] **Ziwei Wang**, Jiwen Lu, Chenxin Tao and Jie Zhou
Learning Channel-wise Interactions for Binary Convolutional Neural Networks
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2019
- [41] Yueqi Duan, **Ziwei Wang**, Jiwen Lu, Xudong Lin and Jie Zhou
GraphBit: Bitwise Interaction Mining via Deep Reinforcement Learning
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2018
- [42] Yueqi Duan, Jiwen Lu, **Ziwei Wang**, Jianjiang Feng and Jie Zhou
Learning Deep Binary Descriptor with Multi-Quantization
IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR), 2017

Honors and Awards

- Outstanding Doctoral Dissertation of Beijing 2024
- Outstanding Doctoral Dissertation of Tsinghua University 2023
- National Scholarship 2022
- National Scholarship 2020
- Chi-Sun Yeh Scholarship 2018
- Qualcomm Scholarship 2016

Invited Talk

- **Efficient Policy Learning for General Bimanual Manipulation**
Embodied AI Workshop, DAI, 2024
- **Embodied Visual Perception in Unknown Environments**
Recent Advances in Video Content Understanding and Generation Tutorial, ECCV, 2024
- **Compact Visual Representation Learning**
Young Annual Conference of Chinese Association of Automation, 2021

Teaching Experience

- School of Electrical and Electronic Engineering, Nanyang Technological University**
Lecturer for Machine Learning Design and Application 2025
- Robotics Institute, Carnegie Mellon University**
Guest speaker for Safety in Provable Control 2024
- Department of Automation, Tsinghua University**
Teaching assistant for Pattern Recognition and Machine Learning 2022

Academic Services

Membership

- Committee member of IEEE Robotics and Automation Society Chapter of Singapore

Journal Reviewer

- IEEE Transactions on Pattern Analysis and Machine Intelligence
- IEEE Transactions on Image Processing
- IEEE Transactions on Neural Networks and Learning Systems
- IEEE Transactions on Circuits and Systems for Video Technology
- IEEE Robotics and Automation Letters
- ACM Transactions on Graphics
- Journal of Field Robotics

Conference Reviewer

- IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR 2020-2025)
- Neural Information Processing Systems (NeurIPS 2020-2025)
- IEEE International Conference on Computer Vision (ICCV 2021, 2023, 2025)
- European Conference on Computer Vision (ECCV 2022, 2024)
- International Conference on Machine Learning (ICML 2021-2025)
- International Conference on Representation Learning (ICLR 2021-2025)
- International Conference on Robotics and Automation (ICRA 2023-2024)