Zhou Ren

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PROFESSIONAL EXPERIENCE

10/2022 – present,   **Applied Science Manager**, Amazon AWS, Seattle, WA, USA

09/2021 – 09/2022, **Principal Research Manager**, Wormpex AI Research, Bellevue, WA, USA

12/2018 – 09/2021, **Senior Research Manager / Founding Member**, Wormpex AI Research, Bellevue, WA, USA

05/2018 – 12/2018, **Senior Research Scientist**, Snap Inc., Los Angeles, CA, USA

10/2017 – 05/2018, **Research Scientist (III)**, Snap Inc., Los Angeles, CA, USA

04/2017 – 10/2017, **Research Scientist (II)**, Snap Inc., Los Angeles, CA, USA

03/2016 – 04/2017, **Research Scientist (I)**, Snap Inc., Los Angeles, CA, USA

06/2010 – 06/2012, **Researcher**, Media Technology Lab, Nanyang Technological University, Singapore

PROFESSIONAL ACTIVITIES

Senior Member of IEEE

Area Chair, IEEE/CVF Conference on Computer Vision and Patter Recognition (CVPR) 2022, 2021

Area Chair, IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2023, 2022

Demo Chair, IEEE Conference on Visual Communication and Image Processing (VCIP) 2022

Senior Program Committee, AAAI Conference on Artificial Intelligence (AAAI) 2022, 2021

Associate Editor, The Visual Computer Journal (TVCJ), 2018 – present

Chair of Industrial Governance Board, Asia-Pacific Signal and Information Processing Association (APSIPA)

EDUCATION

Doctor of Philosophy

09/2012 – 09/2016, *University of California, Los Angeles*
Computer Science Department (*Advisor: Prof. Alan Yuille*)

Master of Engineering

08/2010 – 01/2012, *Nanyang Technological University*, Singapore
School of Electrical and Electronic Engineering (Part-time, *Advisor: Prof. Junsong Yuan*)

Bachelor of Engineering

09/2006 – 06/2010, *Huazhong University of Science and Technology*, China
School of Electronic and Information Engineering (Overall GPA: 91.41/100, Rank: 1/223)

RESEARCH INTERESTS

Human-Centric Visual Analysis, Multimodal Content Understanding, Efficient Machine Learning

HONORS & AWARDS

1st Prize in **ICCV 2021 Low Power Computer Vision Challenge** (among 31 competing teams)

2nd Place in **NIPS 2017 Adversarial Defense Challenge** (among 107 competing teams)

Best Student Paper Award Nominee, **IEEE Conf. on Computer Vision and Pattern Recognition**, 2017

Best Paper Award, **IEEE Transactions on Multimedia**, 2016

Spotlight Promotion Project Award, School of EEE, NTU (6 out of ~200 research projects in EEE), 2011

INDUSTRY EXPERIENCE HIGHLIGHTS

Amazon AWS, Seattle, WA   Oct 2022 – present
Work Hard, Have Fun, Make History

- Applied Science Manager of Amazon Just Walk Out Technology

Wormpex AI Research, Bellevue, WA   Dec 2018 – Sep 2022
AI branch of Bianlifeng: a Top-10 convenience store chain company in China, with over 2800 operating stores

- As one of the 3 founding members, built the team from scratch in Beijing, Shanghai, and Bellevue, WA.
- Manage a team focusing on human-centric visual analysis, such as detection, tracking, pose and gesture, action analysis, person ReID, crowd counting, merchandise recognition, etc.
- Developed an edge-side model training, inference, and deployment pipeline by designing efficient neural network architecture and model compression (1st prize in ICCV'21 Low Power Computer Vision Challenge).
- Delivered several real-world production systems to facilitate new retail logistics ranging from storefronts, warehouses to manufacture, generating millions of revenue annually.

Snap Inc., Los Angeles, CA   Mar 2016 – Dec 2018
AI for entertainment and monetization

- Tech Lead of AI-based content monetization on Snapchat utilizing multimodal user signals such as visual, textual, and audio inputs to perform user profiling and ads targeting.
- Tech Lead of AI-based content security on Snapchat utilizing multimodal user signals such as visual, textual, and audio inputs to detect inappropriate content such as violence, hate, drug and pornography.
- Delivered several AR filters to support creative content creation, such as the context-aware "Moment Filter" and 3D hand lenses.

Media Technology Lab, Nanyang Technological University, Singapore   Jun 2010 – Jun 2012
AI for human gesture analysis and its application in HCI

- Invented the first generation hand gesture recognition system using Kinect sensor with Microsoft Research Redmond (IEEE Trans. on Multimedia 2016 Best Paper Award).
- Developed Human-Computer-Interaction system using hand as the interface.

PUBLICATIONS (GOOGLE SCHOLAR)

(Note: "^" indicates the co-author is the student I mentored during whose internship or during an university collaboration)

JOURNAL

- Sheng Liu^, **Zhou Ren**, and Junsong Yuan, "SibNet: Sibling Convolutional Encoder for Video Captioning",

IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI), 2020. (cited by 83)

- Hongyu Xu^, Xutao Lv, Xiaoyu Wang, **Zhou Ren**, and Rama Chellappa, "Deep Regionlets: Blended Representation and Deep Learning for Generic Object Detection", *IEEE Transactions on Pattern Analysis and Machine Intelligence (TPAMI)*, 2019. (cited by 10)

- Alexey Kurankin, *et. al*, "Adversarial Attacks and Defences Competition", In *The NIPS'17 Competition Book: Building Intelligent Systems*, Springer. (cited by 223)

- Xiaowei Ding, Jianing Pang, **Zhou Ren**, Mariana Diaz-Zamudio, Chenfangfu Jiang, Zhaoyang Fan, Daniel Berman, Debiao Li, Demetri Terzopoulos, Piotr Slomka, and Damini Dey, "Automated Pericardial Fat Quantification from Coronary Magnetic Resonance Angiography", *Journal of Medical Imaging (JMI)*, 2016.

- **Zhou Ren**, Junsong Yuan, and Wenyu Liu, "Minimum Near-Convex Shape Decomposition". *IEEE Trans. on Pattern Analysis and Machine Intelligence (TPAMI)*, vol.35, pp.2546-2552, 2013. (cited by 48)

- **Zhou Ren**, Junsong Yuan, and Zhengyou Zhang, "Robust Part-based Hand Gesture Recognition using Kinect Sensor". *IEEE Trans. on Multimedia (TMM)*, vol.15, pp.1110-1120, 2013. (**IEEE TMM 2016 Best Paper Award**) (cited by 811)

CONFERENCE

- Hongji Guo^, **Zhou Ren**, Yi Wu, Gang Hua, and Qiang Ji, "Uncertainty-Based Spatial-Temporal Attention for Online Action Detection". In *IEEE European Conference on Computer Vision (ECCV)*, 2022.

- Zhenyu Wu^, **Zhou Ren**, Yi Wu, Zhangyang Wang, and Gang Hua, "TxVAD: Improved Video Action Detection by Transformers". In *ACM Multimedia*, 2022.

- Yiding Yang^, **Zhou Ren**, Haoxiang Li, Chunluan Zhou, and Gang Hua, "Learning Dynamics via Graph Neural Networks for Human Pose Estimation and Tracking". In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2021. (cited by 17)

- Chunluan Zhou, **Zhou Ren**, Gang Hua, "Temporal Keypoint Matching and Refinement Network for Pose Estimation and Tracking". In *IEEE European Conference on Computer Vision (ECCV)*, 2020.

- Shiyi Lan^, **Zhou Ren**, Yi Wu, Larry Davis, Gang Hua, "SaccadeNet: A Fast and Accurate Object Detector". In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2020. (cited by 21)

- Ye Yuan, Wuyang Chen, Tianlong Chen, Yang Yang, **Zhou Ren**, Zhangyang Wang, and Gang Hua, "Calibrated domain-invariant learning for highly generalizable large scale re-identification". In *IEEE/CVF Winter Conference on Applications of Computer Vision (WACV)*, 2020. (cited by 25)

- Tan Yu^, **Zhou Ren**, Yuncheng Li, Enxu Yan, Ning Xu, Junsong Yuan, "Temporal Structure Mining for Weakly Supervised Action Detection". In *International Conference on Computer Vision (ICCV)*, 2019. (cited by 57)

- Tianlong Chen^, Shaojin Ding, Jingyi Xie, Ye Yuan, Wuyang Chen, Yang Yang, **Zhou Ren**, Zhangyang Wang, "ABD-Net: Attentive but Diverse Person Re-Identification". In *International Conference on Computer Vision (ICCV)*, 2019. (cited by 296)

- Liuhao Ge^, **Zhou Ren**, Yuncheng Li, Zehao Xue, Yingying Wang, Jianfei Cai, Junsong Yuan, "3D Hand Shape and Pose Estimation from a Single RGB Image". In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. (**Oral**) (cited by 284)

- Jonghwan Mun^, Linjie Yang, **Zhou Ren**, Ning Xu, and Bohyung Han, "Streamlined Dense Video Captioning". In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. (**Oral**) (cited by 76)

- Cihang Xie^, Yuyin Zhou, Song Bai, Zhishuai Zhang, Jianyu Wang, **Zhou Ren**, and Alan Yuille, "Improving Transferability of Adversarial Examples with Input Diversity". In *IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019. (cited by 446)

- Yuncheng Li, Zehao Xue, Yingying Wang, Liuhao Ge, Zhou Ren, and Jonathan Rodriguez, "End-to-End 3D Hand Pose Estimation from Stereo Cameras". In *British Machine Vision Conference*, 2019. (cited by 12)

- Liuhao Ge^, **Zhou Ren**, Junsong Yuan, "Point-to-Point Regression PointNet for 3D Hand Pose Estimation". In *European Conference on Computer Vision (ECCV)*, 2018. (cited by 124)

- Hongyu Xu^, Xutao Lv, Xiaoyu Wang, **Zhou Ren**, and Rama Chellappa, "Deep Regionlets for Object Detection". In *European Conference on Computer Vision (ECCV)*, 2018. (cited by 67)

- Sheng Liu^, **Zhou Ren**, Junsong Yuan, "SibNet: Sibling Convolutional Encoder for Video Captioning". In *ACM Multimedia Conference (ACM MM)*, 2018. (**Oral**) (cited by 83)

- Cihang Xie^, Jianyu Wang, Zhishuai Zhang, **Zhou Ren**, Alan Yuille, "Mitigating Adversarial Effects Through Randomization". In *International Conf. on Learning Representations (ICLR)*, 2018. (cited by 751)

- **Zhou Ren**, Hailin Jin, Zhe Lin, Chen Fang, and Alan Yuille, "Multiple Instance Visual-Semantic Embedding". *In British Machine Vision Conference (BMVC),* 2017. (**Oral**) (cited by 64)

- **Zhou Ren**, Xiaoyu Wang, Ning Zhang, and Li-Jia Li, "Deep Reinforcement Learning-based Image Captioning with Embedding Reward". *In IEEE Conference on Computer Vision and Pattern Recognition (CVPR)*, 2017. (**Oral**) (**Best Student Paper Award Nominee**) (cited by 317)

- **Zhou Ren**, Hailin Jin, Zhe Lin, Chen Fang, and Alan Yuille, "Joint Image-Text Representation by Gaussian Visual-Semantic Embedding". *In ACM Multimedia Conference (ACM MM)*, 2016. (cited by 51)

- **Zhou Ren**, Chaohui Wang and Alan Yuille, "Scene-Domain Active Part Models for Object Representation". *In IEEE International Conference on Computer Vision (ICCV)*, 2015.

- Xiaowei Ding, Jianing Pang, **Zhou Ren**, Mariana Zamudio, Daniel Berman, Debiao Li, Demetri Terzopoulos, Piotr Slomka, and Damini Dey, "Automated Pericardial Fat Quantification from Coronary Magnetic Resonance Angiography". *In Medical Image Understanding and Analysis (MIUA)*, 80-85, 2015. (**Oral**)

- **Zhou Ren**, Junsong Yuan, Chunyuan Li and Wenyu Liu, "Minimum Near-Convex Decomposition for Robust Shape Representation". *In IEEE International Conference on Computer Vision (ICCV)*, 2011. (cited by 98)

- **Zhou Ren**, Junsong Yuan, and Zhengyou Zhang, "Robust Hand Gesture Recognition Based on Finger-Earth Mover's Distance with a Commodity Depth Camera". *In ACM Multimedia Conference (ACM MM)*, Nov. 2011. (cited by 563)

- **Zhou Ren**, Jingjing Meng, Junsong Yuan, and Zhengyou Zhang, "Robust Hand Gesture Recognition with Kinect Sensor". *In ACM Multimedia Conference (ACM MM)*, Nov. 2011. (cited by 388)

- **Zhou Ren**, Jingjing Meng, and Junsong Yuan, "Depth Camera based Hand Gesture Recognition and its Applications in Human-Computer-Interaction". *In IEEE International Conference on Information, Communication, and Signal Processing (ICICS)*, Dec. 2011. (**Oral**) (cited by 256)

- Zhongyuan Lai, Junhuan Zhu, **Zhou Ren**, Wenyu Liu, and Baolan yan, "Arbitrary Directional Edge Encoding Schemes for the Operational Rate Distortion Optimal Shape Coding Framework". *In* 2010 *IEEE Data Compression Conference (DCC)*, pp. 20-29, Nov. 2010. (**Oral**) (cited by 13)

MENTORED STUDENT INTERN COLLABORATORS

- Lluis Castrejon (*2017 Summer*), PhD student at MILA, University of Montreal

- Zhe Li (*2017 Summer*), PhD student at University of Iowa

- Hongyu Xu (*2017 Summer*), PhD student at University of Maryland, College Park

- Cihang Xie (*2017 Fall – 2018 Spring*), PhD student at Johns Hopkins University

- Sheng Liu (*2017 Fall – 2019 Fall*), PhD student at The State University of New York at Buffalo

- Liuhao Ge (*2018 Spring – 2019 Spring*), PhD student at Nanyang Technological University

- Tan Yu (*2018 Summer*), PhD student at Nanyang Technological University

- Shibi He (*2018 Summer*), PhD student at University of Illinois Urbana-Champaign

- Jonghwan Mun (*2018 Summer*), PhD student at Pohang University of Science and Technology

- Tianlong Chen (*2019 Spring*), PhD student at Texas A&M University

- Ye Yuan (*2019 Spring*), PhD student at Texas A&M University

- Wuyang Chen (*2019 Spring*), PhD student at Texas A&M University

- Shiyi Lan (*2019 Summer*), PhD student at University of Maryland, College Park

- Zhenyu Wu (*2020 Summer*), PhD student at Texas A&M University

- Yiding Yang (*2020 Summer*), PhD student at Stevens Institute of Technology

- Tongzhou Mu (*2020 Summer*), PhD student at University of California San Diego

- Hanwen Jiang (*2021 Summer*), PhD student at The University of Texas at Austin

- Kumara Kahatapitiya (*2021 Summer*), PhD student at Stony Brook University

- Hongji Guo (*2021 Summer*), PhD student at Rensselaer Polytechnic Institute

- Yuanhao Zhai (*2022 Summer*), PhD student at The State University of New York at Buffalo

- Wensheng Cheng (*2022 Summer*), PhD student at Stony Brook University

PROFESSIONAL SKILLS

Proficient with PyTorch, Torch, Caffe. Experienced with Microsoft Kinect Sensor, Tensorflow.
Programming languages: C/C++, Python, Lua, Matlab.

PERSONAL QUALIFICATIONS & INTERESTS

Highly self-motivated, passionate, cooperative, bias for action, and deliver results
Basketball, rock climbing, skiing, and fitness

REFERENCES

Available Upon Request