

Huangying ZHAN, Ph.D.

 Scholar |  GitHub |  LinkedIn |  Website |  Email |  Santa Clara, CA

EXPERTISE

Domains	Computer/3D/Robotic Vision; Deep Learning; Robotics
Applications	
3D Reconstruction	Depth Estimation; Neural Reconstruction; Active Reconstruction; NeRF
SLAM and Navigation	Visual Odometry; 3D Scene Graph; Topological Mapping; Path Planning
Spatio Photo/Video	Novel View Rendering; NeRF; Gaussian Splatting; Layered Representations

EDUCATION

2017.02 - 2020.08	The University of Adelaide <i>Ph.D. Computer Science Thesis: Self-Supervised Learning for Geometry</i>	Adelaide, Australia
2012.09 - 2016.07	The Chinese University of Hong Kong <i>B.Eng. Electronic Engineering (First Class Honours) Major GPA: 3.8/4.0</i>	Hong Kong, China

EXPERIENCE

InnoPeak Technology Inc. (OPPO US Research Center) <i>Staff Research Engineer</i>	2022.10 - present
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3D Photography/Videography:

- Development of technologies for transforming stereoscopic media (photos/videos) into an immersive 6DoF media on MR devices, delivered through enhanced streaming and on-device viewing experiences.
- Lead the framework development and collaborate with cross-functional teams, actively participating in every phase from data collection and algorithm development to deployment and testing.
- Application of various techniques including:
 - * *Data simulation* through generating videos with dynamic scenes using Habitat-Simulator.
 - * *Scene understanding* through semantic segmentation, image matting, and depth estimation.
 - * *AIGC* using Stable Diffusion-based inpainting.
 - * *Efficient rendering* using layered representations, NeRF, and Gaussian Splatting.

3D Reconstruction and Scene Understanding:

- Lead the development of a *Stereo Matching* system for dense depth estimation, tailored for on-device applications. Involved in model design, training, deployment, and testing to ensure optimal performance.
- Lead the development of a *3D Semantic Object Retrieval* system using multi-modality model, optimized for mobile device performance. Lead the design, implementation, and integration of the framework.
- Mentor research interns on projects related to active reconstruction systems and scene understanding systems. [🏠 Project page](#) | [🔗 NARUTO](#)

Australian Institute for Machine Learning, The University of Adelaide <i>Postdoctoral Researcher</i>	2020.08 - 2022.09
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Embodied AI - Active Visual Navigation in an Unexplored Environment:

- Develop an autonomous exploration and navigation system to enhance goal-based visual navigation.
- Develop an RGB-only active 3D reconstruction framework using NeRF in an online manner.

High-quality Novel View Selfie Synthesis:

- Develop a novel view synthesis method for selfie videos, which involved dataset acquisition and processing, system implementation, and experiment design and evaluation.

Microsoft

2018.07 - 2018.10

Research Intern (HoloLens)

Learning Stereo by Walking Around with a HoloLens:

- Develop semi-supervised deep learning models for stereo matching, which involved acquiring, preprocessing, and creating a large-scale dataset, along with training deep neural networks.

Australian Centre for Robotic Vision

2017.02 - 2020.08

PhD Researcher

Scene Understanding:

- Develop advanced visual odometry methods that integrate deep learning and geometry. [🔗 DF-VO](#)
- Develop advanced single-view depth and surface normal estimation methods that integrate self-supervised learning and classical geometry. [🔗 Depth-VO-Feat](#) | [🔗 SC-SfMLearner](#) | [🔗 SC-Depth](#)
- Lead a team to develop a topological mapping system, recognized as part of the "Best of ACRV" Legacy at the Center. [🔗 TopoSLAM](#)

The National University of Singapore (Unmanned System Research Group)

2016.08 - 2017.02

Visiting Research Scholar

Deep Learning for Drone Related Applications:

- Develop a drone landing marker detection method based on Faster-RCNN [🔗 MarkerDet](#)
- Develop a deep learning based 2D LiDAR scan matching and loop closure algorithm

The Chinese University of Hong Kong

2015.05 - 2016.07

Research Assistant

Large-scale Clothing Image Classification and Retrieval:

- Develop deep learning models for clothing image classification and retrieval, which involved data crawling, preprocessing, and creating a large-scale dataset, along with training deep neural networks.

Quantization training for CNNs:

- Develop a training method to reduce error when converting neural network weights from floating-point to fixed-point representation

PUBLICATIONS (SELECTED)

Summary: 10+ publications in top conferences/journals in the field of computer vision, machine learning, and robotics. Citation: **2000+**; H-index: **11**. For the full list, please visit [🔗 Google Scholar](#).

Zhan, H., Garg, R., Weerasekera, C. S., Li, K., Agarwal, H., Reid, I. (CVPR-2018). Unsupervised learning of monocular depth estimation and visual odometry with deep feature reconstruction. In Proceedings of the IEEE conference on computer vision and pattern recognition (pp. 340-349).

Zhan, H., Weerasekera, C. S., Bian, J. W., Reid, I. (ICRA-2020). Visual odometry revisited: What should be learnt?. In 2020 IEEE international conference on robotics and automation (pp. 4203-4210). IEEE.

Zhan, H., Feng, Z. et al. , (CVPR 2024). NARUTO: Neural Active Reconstruction from Uncertain Target Observations. In Proceedings of the IEEE conference on computer vision and pattern recognition

Bian, JW., **Zhan, H.**, Wang, N., Li, Z., Zhang, L., Shen, C., Cheng, MM, Reid, I. (IJCV 2021) Unsupervised Scale-Consistent Depth Learning from Video. Int J Comput Vis 129, 2548–2564

Bian, JW, **Zhan, H.**, Wang, N., Chin, T.J., Shen, C. and Reid, I., (TPAMI 2021). Auto-rectify network for unsupervised indoor depth estimation. IEEE transactions on pattern analysis and machine intelligence, 44(12), pp.9802-9813.

SKILLS

Programming Languages	Python, C++, MATLAB, LATEX
Python/Machine Learning	PyTorch, Caffe, TensorFlow, scikit-learn, numpy, panda, matplotlib, OpenCV
Software Engineering	Linux (Ubuntu), Windows, Git, Docker, conda, Kubernetes, GCP
Languages	English, Mandarin Chinese, Cantonese, Hokkien

ACADEMIC SERVICES

Postgraduate Supervisor, The University of Adelaide 2021.02 - 2022.08

- Supervise and guide the thesis projects of Master's students to completion.
- Completed: Master of Computer Science (1) / Data Science (1) / Machine Learning (1)

Conference/Journal Reviewer 2018 - present

Computer Vision	CVPR; ICCV; ECCV; ICPR; ACCV; TPAMI; TMM; TCSVT
Robotic	ICRA; IROS; T-RO; RAL
Artificial intelligence	NeuIPS; AAAI; ICLR

AWARDS/HONORS

OPPO XR Department Performance Excellence Award 2024.03

Recognized for outstanding leadership and contribution in advancing the projects and demonstrating exceptional collaboration skills with cross-functional teams.

ACCV Outstanding Reviewer Award 2022.12

Recognized for having provided helpful, high-quality reviews.

Australian Distinguished Talent (Permanent Residency) 2020.11

Global Talent Independent Program for internationally recognized record of exceptional and outstanding achievements in the Data Science sector.

Best Three Minute Thesis, ACRV Robotic Vision Symposium 2019.11

For PhD researcher having best communicated their work in robotic vision to audiences in only 180 seconds.

Uni. Adelaide International Wildcard Scholarship & ACRV Top-up Scholarship 2017 - 2020

Full fee and top-up scholarships awarded to exceptional international students to support their study.

Academic Honors and Scholarships at CUHK 2012 - 2016

College Head's List (United College)	2016
Dean's List (Faculty of Engineering)	2014, 2016
Professor Charles K. Kao Research Exchange Scholarship	2016
HKEIA Project Competition Award, Merit	2016
Final-Year Project Poster Award, 3rd Prize	2016
Undergraduate Summer Research Internship Scholarship	2015
HKSAR Talent Development Scholarship	2014
Suga International Holdings Limited Scholarship	2014
Simatelex Charitable Foundation Scholarship	2014
Tsang Shui Tim Scholarship	2014
Electronic Engineering Scholarship	2012