Xiaoyang Guo

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EDUCATION

The Chinese University of Hong Kong, Hong Kong SAR

- Ph.D. @ MMLab — Aug 2017 – Aug 2021
  - Supervised by Prof. Xiaogang Wang & Prof. Hongsheng Li
  - Thesis in stereo-based depth estimation and 3D detection. (722 Citations by May 15, 2023)
  - Awardee of Hong Kong PhD Fellowship Scheme (HKPFS)

Tsinghua University, Beijing, China

- B.Eng. in Computer Science and Technology — Aug 2013 – Jul 2017
  - GPA: 92 / 100

RESEARCH INTERESTS

- Research Interests: Deep Learning and 3D Vision
- Focus on stereo matching, 3D reconstruction (traditional, MVSNet, NeuS), and large-scale NeRF Rendering

EXPERIENCE

Huawei Inc., Riemann Lab, 2012 Laboratories, Shenzhen

- Principal Engineer — Oct 2021 – Present
  - Developed a full-stack algorithm for reconstructing CAD models from indoor multi-view images. To improve robustness to noisy data, a deep-learning-based multi-view stereo library was developed to improve the reconstruction completeness. A CAD construction algorithm based on graphcut was designed to reduce the data annotation cost.
  - Created an industry-leading neural radiance field library that supports large-scale (up to 20 sq-km) and diverse scene rendering (UAV, indoor, and outdoor environments). This library is robust against camera pose errors and supports real-time rendering. Public news reports on our previous work can be found here: [link1] [link2];
  - Currently I am working on ultra-high-quality NeRF and neus-based closed-loop autonomous driving simulation framework.

Google, Seattle, USA

- Research Intern — Jul 2019 – Sep 2019
  - Advised by Raviteja Vemulapalli. Worked on unsupervised human-pose estimation.

SenseTime Group Limited, Beijing, China

- Research Intern — May 2018 – Sep 2018
  - Advised by Liwei Wu. Worked on cross-spectral stereo matching for face anti-spoofing.

Tsinghua & The University of Western Australia

- Research Intern (for Undergraduate Thesis) — Apr 2017 – Jun 2017
  - Advised by Prof. Zhihui Du. Conducted CUDA optimization for real-time gravitational wave detection.

Carnegie Mellon University, Pittsburgh, USA

- Research Intern — Jul 2016 – Aug 2016
  - Supervised by Prof. Abhinav Gupta and Xiaolong Wang. Worked on video-based action localization research.

PUBLICATIONS

[1] Jingwei Huang, Shanshan Zhang, Bo Duan, Yanfeng Zhang, **Xiaoyang Guo**, Mingwei Sun, and Li Yi. Arrangementnet: Learning scene arrangements for vectorized indoor scene modeling. In *SIGGRAPH 2023 Journal Track, final version submitted*

- Proposed a novel vectorized indoor modeling approach that converts point clouds into building information models (BIM).

[2] **Xiaoyang Guo**, Shaoshuai Shi, Xiaogang Wang, and Hongsheng Li. Liga-stereo: Learning lidar geometry aware representations for stereo-based 3d detector. In *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, 2021

- We proposed to enhance the training of stereo-based 3D detectors by incorporating high-level geometry-aware features obtained from LiDAR detectors. This approach improves 3D detection accuracy by 5∼10% mAP on the KITTI benchmark. (Ranked 1st among all stereo-based methods as of July 1st, 2021.)

[3] **Xiaoyang Guo**, Kai Yang, Wukui Yang, Hongsheng Li, and Xiaogang Wang. Group-wise correlation stereo network. In *Conference on Computer Vision and Pattern Recognition (CVPR)*, 2019

- We introduced a novel operation called group-wise correlation to construct cost volumes for stereo matching, which enables improved and more efficient similarity measurement. Our method outperforms state-of-the-art approaches on the KITTI dataset.

[4] **Xiaoyang Guo***, Mingyang Liang*, Hongsheng Li, Xiaogang Wang, and You Song. Unsupervised cross-spectral stereo matching by learning to synthesize. In *33rd AAAI Conference on Artificial Intelligence (AAAI)*, 2019 **(Oral) (* Equal Contributions)**

- We propose a novel unsupervised cross-spectral stereo matching framework. To minimize appearance variations between multi-spectral images, we train a spectral adaptation network with adversarial learning and disparity-aware consistency loss. This network is optimized end-to-end alongside an unsupervised stereo matching network.

[5] **Xiaoyang Guo**, Hongsheng Li, Shuai Yi, Jimmy Ren, and Xiaogang Wang. Learning monocular depth by distilling cross-domain stereo networks. In *Proceedings of the European Conference on Computer Vision (ECCV)*, 2018

- A stereo matching network is employed as a proxy to learn depth information from extensive synthetic data. This acquired depth information is subsequently utilized to supervise monocular depth estimation networks. Experimental results show state-of-the-art performance in monocular depth estimation.

[6] Hongyang Li, **Xiaoyang Guo**, Bo Dai, Wanli Ouyang, and Xiaogang Wang. Neural network encapsulation. In *Proceedings of the European Conference on Computer Vision (ECCV)*, 2018

- We approximate the routing process in Capsule networks with a two-branch design, significantly reducing the complexity and runtime of capsule networks.

AWARDS & SCHOLARSHIPS

- Scholarship for Academic Excellence (top 10%) 2014
- National Scholarship (top 5%) 2015
- Apac Tsinghua Ceo Cci Bhd Scholarship (top 10%) 2016
- Hong Kong PhD Fellowship (Only 300 awardees per year) 2017

TEACHING

- Tutor ENGG1110: Problem Solving by Programming 2019
- Tutor ENGG2420: Complex Analysis and Differential Equations for Engineers 2020
- Tutor ELEG5491: Introduction to Deep Learning 2021

SKILLS

- Computer Languages: Python, C, C++, CUDA, HTML, JavaScript, Swift, Bash
- Softwares & Skills: PyTorch, Linux, OpenCV, MeshLab, Blender, Camera Calibration