Tianyu Luan

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Profile

Tianyu Luan is a final-year Ph.D. candidate at the State University of New York at Buffalo, Buffalo NY, United States, advised by Prof. Junsong Yuan. He received a B.S. degree in Applied Physics at University of Science and Technology of China, Hefei Anhui, China in 2013, and M.Eng. degree in Electronical and Telecommunication Engineering at Tsinghua University, Beijing, China in 2017. His research interest lies in 3D human perception prior & 3D generation.

Education

2021-pres. **State University of New York at Buffalo**, Buffalo, NY, United States

Ph.D. candidate (3rd year), Computer Science.
Reseach topic: 3D shape fidelity measurement, recovery, and creation.

2014-2017 **Tsinghua University**, Beijing, China

M.Eng., Electronic Engineering.
Reseach topic: Visual Light Communication.

2009-2013 **University of Science and Technology of China**, Hefei, China

B.S., Applied Physics.

Experiences

June 2024 - present **Pixocial**, Bellevue, WA, United States
Research Intern. Worked with Dr. Haoxiang Li.

3D human generation.

Feb 2024 - May 2024 **United Imaging Intelligence**, Burlington, MA, United States
Research Intern. Worked with Dr. Zhongpai Gao and Dr. Ziyan Wu.

3D human hand reconstruction.

May 2023 - Aug 2023 **United Imaging Intelligence**, Cambridge, MA, United States
Research Intern. Worked with Dr. Zhongpai Gao and Dr. Ziyan Wu.

3D human body reconstruction.

May 2022 - Aug 2022 **OPPO Research**, Palo Alto, CA, United States
Research Intern. Worked with Dr. Zhong Li and Dr. Yi Xu.

3D hand reconstruction & mesh detailed evaluation.

Jul 2019 - Jun 2021 **Chinese Academy of Science**, Shenzhen, Guangdong, China
Research Assistant. Worked with Prof. Yali Wang and Prof. Yu Qiao.
3D human body reconstruction & pose estimation.

Jun 2017 - Apr 2019 **HUAWEI Technology Co. Ltd.**, Shenzhen, Guangdong, China
Multimedia Algorithm Engineer.
3D human face/object reconstruction R&D.

Selected Works

- **Human perception aligned 3D shape metric.**
  - A spectrum-based 3D metric used on mesh shape comparison.
  - Analytic design and much closer to human perception than previous metrics.
  - Part connection module when multiple parts are visible in one image.
  - The work has been accepted by CVPR2024.
- **3D hand reconstruction with shape details.**
  - Reconstruction of high-fidelity hand mesh from monocular RGB inputs.
  - Using Mesh frequency decomposition to recover high-frequency details.
  - Generating high-fidelity hands in a coarse-to-fine manner.
  - The work has been published by CVPR2023.
- **Human body part reconstruction.**
  - A framework that independently reconstructs the mesh of each body part.
  - Input: monocular image with only a few body parts visible.
  - Part connection module when multiple parts are visible in one image.
  - The work has been submitted to ECCV2024.
- **Pose calibrated 3D human mesh reconstruction.**
  - A kinematic-based light-weighted framework to calibrate human body mesh using human pose.
  - 2 framework designs to leverage mesh accuracy and computational costs
  - The pose estimator and body mesh generater are designed in a plug-in manner.
  - The work is published in AAAI2021 Main Track.
- **RGB-D sequence based human face reconstruction.**
  - Reconstruction of human face mesh from depth video using ICP and TSDF.
  - Texture map generated from a selected frame set in color video using graph-cut
  - The demo is shown in the HONOR V20 release event.

Selected Publications

[1]. **Tianyu Luan**, *et al.* "Spectrum AUC Difference (SAUCD): Human-aligned 3D Shape Evaluation." *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2024. [Paper]

[2]. **Tianyu Luan**, *et al.* "High Fidelity 3D Hand Shape Reconstruction via Scalable Graph Frequency Decomposition." *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2023. [Paper][Code]

[3]. Luyuan Xie, Manqing Lin, **Tianyu Luan**†, *et al.* "MH-pFLID: Model Heterogeneous personalized Federated Learning via Injection and Distillation for Medical Data Analysis." *International Conference on Machine Learning (ICML)*, 2024. [Paper]

[4]. Xianzu Wu, Xianfeng Wu, **Tianyu Luan**, *et al.* "FSC: Few-point Shape Completion." *Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*. 2024. [Paper]

[5]. Yuanhao Zhai, **Tianyu Luan**, *et al.* "Towards Generic Image Manipulation Detection with Weakly-Supervised Self-Consistency Learning" *Proceedings of the IEEE/CVF International Conference on Computer Vision (ICCV)*, 2023. [Paper][Code]

[6]. **Tianyu Luan**, *et al.* "PC-hmr: Pose calibration for 3d human mesh recovery from 2d images/videos." *Proceedings of the AAAI Conference on Artificial Intelligence (AAAI)*. 2021. [Paper]

Teaching

- 21 Fall, Teaching Assistant, Computer Vision and Image Processing (CSE 573), University at Buffalo.
- 22 Spring, Teaching Assistant, Computer Vision and Image Processing (CSE 573), University at Buffalo.
- 22 Fall, Teaching Assistant, Computer Vision and Image Processing (CSE 573), University at Buffalo.

Service

- Reviewer of CVPR'23'24, ICCV'23, ECCV'24, ACM MM'24.