Tianyu Luan

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Profile

I'm a 3rd-year Ph.D. candidate at the State University of New York at Buffalo advised by Prof. Junsong Yuan. My research interest covers human body/hand pose estimation & mesh reconstruction.

Education

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

Ph.D. candidate (3rd year), Computer Science.
Reseach topic: 3D mesh reconstruction.

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

M.Eng., Electronic Engineering.

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

B.S., Applied Physics.

Experiences

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 Techonology Co. Ltd.**, Shenzhen, Guangdong, China
Multimedia Engineer.

3D human face/object reconstruction R&D.

Selected Works

- **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 CVPR2024.
- **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 submitted to CVPR2024.
- **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.* "High Fidelity 3D Hand Shape Reconstruction via Scalable Graph Frequency Decomposition." Proceedings of the IEEE/CVF Conference on Computer Vision and Pattern Recognition. 2023. [Paper][Code]

[2]. **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*. Vol. 35. No. 3. 2021. [Paper]

[3]. 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, pp. 22390-22400. [Paper][Code]

Skills

Programming: *Python, C++, Matlab*
Tools: *PyTorch, Blender, MeshLab.*
Mathematics: *Calculus, Linear algebra, Probabilities, Multi-view geometry, Discrete differential geometry.*