Jiahao Luo

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Education

University of California, Santa Cruz — **Santa Cruz, CA, USA**
Ph.D. in Computer Science and Engineering
advised by prof. Jame Davis and prof. Alex Pang — Sep 2021 - present

University of California, Santa Cruz — **Santa Cruz, CA, USA**
M.S. in Electrical and Computer Engineering — Sep 2018 - Jun 2020

Beijing University of Post and Telecommunications (BUPT) — **Beijing, China**
B.Eng. in Electronic Engineering — Sep 2014 - Sep 2018

Current Research

3D Gaussian Splatting For Human Face — **Sep 2023 - present**

- Propose SplatFace, a novel Gaussian splatting framework simultaneously delivers both high-quality novel view rendering and accurate 3D mesh reconstructions with a joint optimization strategy that refines both the Gaussians and a morphable surface through a synergistic non-rigid alignment process.
- Introduce splat-to-surface distance, a novel metric considering both the Gaussian position and covariance.
- Introduce object-space densification utilizing the surface structure in addition to view-space densification in 3DGS.
- SplatFace is competitive with both other Gaussian splatting techniques in view synthesis and other 3D reconstruction methods in producing 3D face meshes with high geometric precision.
- SplatFace is submitted to ECCV 2024

3D Human Face Mesh Reconstruction From Images — **Sep 2021 - present**

- An end-to-end self-calibrated pipeline that disjointly estimates the camera pose from restricted views and reconstructs high-quality topologically consistent 3D with passive stereo and 3D morphable model (3DMM). Our pipeline outperforms state-of-the-art multi-view reconstruction methods by 15-20% on multiple datasets. Related papers are published in ICCVW 2023, ICIP2022
- A careful analysis about 3D face reconstruction accuracy and the type of input data including scan with missing regions, normal, texture, dense landmarks etc. and their combinations. e.g. a tiny amount of 3D information can significantly boost the results from a single image.
  The related paper is selected as oral presentation in CVPR 2022

Publications

SplatFace: Gaussian Splat Face Reconstruction Leveraging an Optimizable Surface
Jiahao Luo, Jing Liu, James Davis.
ECCV 2024 submitted

Disjoint Pose and Shape for 3D Face Reconstruction
Raja Kumar*, **Jiahao Luo***, Alex Pang, James Davis.
ICCV workshop 2023 (Co-first author)

How much does input data type impact final face model accuracy?
Jiahao Luo, Fahim Hasan Khan, Issei Mori, Akila de Silva, Eric Sandoval Ruezga, Minghao Liu, Alex Pang, James Davis.
CVPR 2022 Oral presentation

How accurate is 2-view stereo to reconstruct a 3D face model?
Jiahao Luo, Eric Ruezga, James Davis.
ICIP 2022

DuelGAN: A Duel Between Two Discriminators Stabilizes the GAN Training
Jiaheng Wei, Minghao Liu, **Jiahao Luo**, Andrew Zhu, James Davis, Yang Liu.
ECCV 2022

- A multiple-discriminators solution to improve the stability of generative adversarial network. DuelGAN employs a Duel-GAME to maintain a delicate balance between agreement and disagreement. This strategic approach effectively mitigates model collapse during training, leading to better image quality.

Low-light Image Enhancement Using Chain-consistent Adversarial Networks
Minghao Liu, **Jiahao Luo**, Xiaohan Zhang, James Davis, Yang Liu.
ICPR 2022

- A GAN solution for low-light image enhancement. It achieves the best numerical and human evaluations performance compared to baseline deep learning methods and Gamma Correction.

Face Models: How good does my data need to be?
Jiahao Luo, Fahim Khan, Issei Mori, Akila de Silva, Eric Ruezga, James Davis.
ICIP 2021

Impedance Compensation of the Welding Area of the RF Connector and Microstrip Line
Ziren Wang, Jinchun Gao, Hafiz Muhammad Bilal, **Jiahao Luo**, Xiaoming Li.
ICCCAS 2018

Intern Experience

Regressing 3D human face shape from RGB images, Computer vision engineer intern **Oct 2020 - Aug 2021**
Bellus3D (later bought by Meta) | Mentor: Eric Chen

- Proposed a VGG-based 3D human face reconstruction neural network from only RGB images to assist water-tight, high-accuracy (less 0.3mm MAE) mobile capture of human face.
- Reduce the dependence and later replace depth sensors of the iPhone front camera, and facilitate the development of an Android application.

Assistant product manager **Mar 2018 - Jun 2018**
Bianlifeng | Mentor: Xinglong Fan

Reviewer Experience

ECCV 2024

Skills

Python	PyTorch3D	PyTorch
MATLAB	OpenCV	Open3D

Award

- **CVPR 2022 Oral presentation** **Jun 2022**
- **UCSC Chancellor's fellowship** **Mar 2021**

Class projects

Light direction estimation for Reflectance Transformation Imaging (RTI)	2019.09-2019.12
A survey about GAN-based anomaly detection	2019.07-2019.08
Image salient region detection using entropy analysis	2019.04-2019.06
Car-GAN: a modified GAN model generating car images from edges	2019.01-2019.04