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 Alex Pang 2021.09-present
University of California, Santa Cruz **Santa Cruz, CA, USA**
M.S. in Electrical and Computer Engineering 2018.09-2020.06
Beijing University of Post and Telecommunications (BUPT) **Beijing, China**
B.Eng. in Electronic Engineering 2014.09-2018.06

Research Experience

Face-Splatting: Few-shot High-Quality Human Face View Synthesis and Reconstruction **2023.09-present**
My role in this project: propose all the ideas and lead the team

- Face-Splatting introduces an innovative 3D Gaussian Splatting model designed specifically for facial reconstructions using limited RGB inputs (typically only 1-3 views).
- Face-Splatting leverages a jointly-optimized face prior, which prioritizes the alignment and orientation of Gaussian points in accordance with the surface and normals derived from the face prior.
- Face-Splatting has already achieved state-of-the-art performance in both 3D reconstruction and novel view synthesis.

Disjoint Pose and Shape for 3D Face Reconstruction **2022.01-2023.07**
My role in this project: propose most of ideas and co-lead the team

- Proposed 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 at ICCV 2023 workshop and ICIP 2022.

How much does input data type impact final face model accuracy? **2021.03-2022.06**
My role in this project: propose almost all the ideas and lead the team

- A careful analysis about 3D 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.
- It also investigates the robustness of the reconstruction against noise and structured errors present in the input data.
- Related papers are both published at ICIP 2021 and selected as an oral presentation during CVPR 2022.

Regressing 3D human face shape from RGB images, Computer vision engineer intern **2020.10-2021.08**
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.
- The goal is to reduce the dependence and in the end replace depth sensors of the iPhone front camera, and facilitate the development of an Android application.

DuelGAN: A Duel Between Two Discriminators Stabilizes the GAN Training **2020.05-2021.05**
My role in this project: conduct experiments on real and synthetic datasets

- Proposed DuelGAN, a multiple discriminators solution to improve the stability of generative adversarial network (GAN), which was accepted for publication at ECCV 2022.
- DuelGAN employs a dual discriminator setup (D) along with 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.
- Conducted experiments on synthetic and real datasets, demonstrating that DuelGAN effectively addresses mode collapse and generates high-quality image samples compared to baseline work.

ChainGAN: Low-light image enhancement using chain-consistency network **2020.01-2020.12**
My role in this project: make the main idea work and co-lead the team

- ProposeChainGAN, a generative adversarial net (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. ChainGAN was presented at ICPR 22, demonstrating its effectiveness for image enhancement.

Publications

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

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

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

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

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

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

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

Skills

- **Skilled programming language:** Python, MATLAB, PyTorch, PyTorch3D, OpenCV, Open3D

Award

- **UCSC Chancellor's fellowship** **2021.03**

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