KAIYUE SHEN

◇ C Permit (no sponsorship) ◇ (+41) 76 817 2997 ◇ shenkaiyue1997@gmail.com ◇ skype-line.github.io

EDUCATION

ETH Zürich 2019 - 2022
M.S. in Electrical Engineering & Information Technology, mit Auszeichnung *GPA: 5.82 / 6*

University of Electronic Science and Technology of China 2015 - 2019
B.S. in Electronic Information Engineering *GPA: 91.5 / 100 (Rank: 1 / 285)*

WORK EXPERIENCE

Arbrea Labs AG Switzerland, Deep Learning & Computer Vision Engineer May 2023 - present

- Co-developed a new 3D body reconstruction and simulation product from scratch. My contributions spanned real-data scraping (Python), synthetic data generation (Blender), deep learning model training and evaluation (PyTorch), low-level 3D model optimization (C++), and iOS deployment with UI and unit tests (Swift).

  Key independent contributions:

  - Designed and implemented a synthetic data generation pipeline (MakeHuman, Blender) that increased shape diversity, enhanced the realism of rendered images, and reduced annotation costs.
  - Refactored and optimized an existing C++ 3D mesh optimization module, adding caching strategies and new regularization terms to support the more complex body model and achieve faster, more stable reconstructions.

- Redesigned the deep feature learning system for our main product by replacing the legacy CNN with a transformer-based model trained on our large synthetic dataset using synthetic-to-real distillation, significantly improving robustness despite limited real medical-aesthetics data.

- Developed a ModernGL-based visualization and annotation tool to efficiently build a high-precision evaluation set, integrating our deep feature learning model in the background to streamline accurate 2D ground-truth feature acquisition.

- Supervised three bachelor theses at ETH Zurich on human body pose estimation, face alignment, and texture inpainting, guiding students on research, literature sourcing, and clear, logical presentation for successful defenses.

Advanced Interactive Technologies Lab, ETHZ, Research Assistant Nov. 2022 - Mar. 2023
The Electromagnetic Database of Global 3D Human Pose and Shape in the Wild (Co-Author, ICCV 2023)

- Applied model optimization techniques from my master's thesis to improve the accuracy and efficiency of the multi-stage optimization pipeline for dataset construction.

- Captured and processed 58 minutes of multi-modal motion data using wireless electromagnetic sensors and a handheld iPhone, and conducted evaluations of state-of-the-art monocular RGB methods on the collected dataset.

Seervision AG Switzerland, Computer Vision Engineer Intern September 2021 - March 2022

- Evaluated multiple state-of-the-art person re-identification algorithms and integrated the top-performing model into the product codebase, significantly improving mAP metrics.

- Developed a shadow-detection algorithm to enhance person re-identification accuracy in challenging lighting conditions.

- Created and validated a product-testing dataset on our SV-DOP server against diverse edge cases, identifying key factors that informed product design improvements.

PROJECTS

X-Avatar: Expressive Human Avatars [Project Page]   Apr. 2022 - Nov. 2022
Master Thesis (Co-First Author, CVPR 2023)   *Advanced Interactive Technologies Lab, ETHZ*

- Developed a fully-controllable human avatar model in PyTorch, capable of learning from multiple input modalities, including 3D scans and RGB-D data.

- Designed a coarse-to-fine registration pipeline to accurately fit a parametric model to motion-captured scans.

- Collected and curated a high-quality dataset of 35,500 textured scans from 20 clothed individuals, capturing diverse body poses, hand gestures, and facial expressions.

Continual Learning for 2D Image Segmentation   Oct. 2020 - Feb. 2021
Semester Project (Score: 5.75/6)   *Autonomous Systems Lab, ETHZ*

- Developed a continual learning system for foreground and background segmentation using a U-Net structured model in TensorFlow.

- Experimented with multiple continual learning strategies (feature distillation, elastic weight consolidation, progress & compress) to optimize segmentation performance.

- Evaluated on the NYU dataset, achieving 89.19% accuracy on new tasks while maintaining 89.9% on previously learned tasks.

3D Object Reconstruction Using Azure Kinect   Mar. 2020 - July 2020
Course project of 3D Vision (Score: 5.75/6)

- Developed an object reconstruction pipeline using existing SLAM frameworks, incorporating a learning-based depth error compensation method for Time-of-Flight cameras (Python, C++).

- Evaluated the pipeline with the Azure Kinect RGB-D camera, achieving superior depth correction compared with the method used in BAD SLAM.

AWARDS

- 2017-2018 National Scholarship   *Ministry of Education of P.R.C*, 2018.

- 2016-2017 National Scholarship   *Ministry of Education of P.R.C*, 2017.

- 2015-2016 National Scholarship   *Ministry of Education of P.R.C*, 2016.

- The Meritorious Winner in Mathematical Contest in Modeling (MCM) *(Top 1%)*   *COMAP*, 2018.

SKILLS

Programming:	Python (PyTorch, TensorFlow, Scikit-Learn, Keras), C++, Swift, MATLAB
Tools & Platforms:	Linux, Git, Docker, Blender, Gemini CLI
Hobbies & Interests:	Skiing, tennis, badminton, fitness, hiking, cycling, ice skating, baking