Hanyuan Xiao

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INTRODUCTION

I am a second year PhD student in Vision and Graphics Lab at Institute for Creative Technologies (ICT), an affiliated institution of University of Southern California. My research area includes interdisciplinary area of Computer Vision and Computer Graphics. My focus is on Augmented Reality (AR), 3D reconstruction and rendering in particular.

EDUCATION

- **University of Southern California (USC)** — Los Angeles, CA
  Doctorate (PhD) in Computer Science; GPA: 3.82 — *May 2024*

- **University of Southern California (USC)** — Los Angeles, CA
  Master of Science (M.S.) in Data Science; GPA: 3.82 — *May 2021*

- **Rensselaer Polytechnic Institute (RPI)** — Troy, NY
  Bachelor of Science (B.S.) in Computer Science and Electrical Engineering (dual major); GPA: 3.95 — *May 2019*
  - **Honor**: Dean's Honor List (2015-2018), Distinguished Student

RELATED RESEARCH & PROJECTS

- **3D Scene Segmentation and Reconstruction** — Los Angeles, CA
  Research project — *May 2020 — Present*

- **Differentiable Physically-based Face Shader** — Los Angeles, CA
  Research project — *October 2020 — Present*

- **3D Stitching and Reconstruction** — Los Angeles, CA
  Research project — *September 2019 — March 2020*
  - **Component Searching and Merging**: Introduced new high-level feature to pre-knowledge to refine 3D reconstruction by searching base main body and merging with parts of new features.
  - **Special Keypoint Search on Symmetric Objects**: Investigated method to match 3D keypoints on objects with repetitive patterns with spatial knowledge.

- **Food Method GAN** — Los Angeles, CA
  Course project — *September 2019 — December 2019*
  - **Generation via Food Method**: Introduced food cooking method as a new input for food image generation task where our model achieves the best result quantitatively compared with prior work.

- **Water Freezing Simulation** — Los Angeles, CA
  Course project — *November 2019 — December 2019*
  - **Blender Simulation**: Developed a Blender project to simulate supercooling phenomenon in nature referring related work.

- **VR Acquisition & Application Development for School of Engineering Research** — Troy, NY
  Undergraduate Researcher — *January 2018 — Spring 2019*
  - **Photogrammetry**: Implemented 3D reconstruction pipelines such as PMVS and COLMAP to generate and merge models.
  - **3D Reconstruction Optimization**: Developed and exploited functions in area of computer vision to further optimize models and merge into large-scale 3D environment to recover indoor and outdoor scenes in virtual reality.

- **Google Cardboard AR/VR Research** — Troy, NY
  Software Engineer, Undergraduate Researcher — *September 2017 — June 2018*
  - **RPI 360 Tour (VR)**: Developed a VR platform implementing *Google Maps* API, *Google Street View* and a database using AWS to allow users to visit RPI Troy campus online with any VR system.
  - **A-Frame Virtual Reality Framework**: Solved issues in open-source project aframe.io, such as consistency and compatibility test on different hardware platforms and documentation.

- **Emergency Detection System** — Troy, NY
  Team SmartRPI, Team Leader — *May 2017 — June 2017*
  - **Leadership**: Led team to study and collaborate with Professor Kenneth A. Connor from research center LESA.
  - **Multitasking**: Multitasking in development and debug through hardware to software in whole project.
  - **iPhone Application & Microelectronics Circuitry**: Implemented Swift programming language on iOS platform and C programming language on Arduino to allow communication between iPhone and Arduino UNO via Bluetooth (BLE).

Recent Related Courses

- **Advanced Computer Vision**   2020 Fall
  - **Conventional and Modern Approach towards Computer Vision**: Apply linear algebra and develop algorithms to solve problems such as image alignment, object identification and segmentation, descriptor extraction with implementation of open source libraries such as *OpenCV* and *Pytorch*.

- **Deep Learning and its Applications**   2019 Fall
  - **Project Food Generation From Ingredients and Cooking Method**: Proved that cooking method extracted from instruction is useful and efficient for food image generation task by providing qualitative and quantitative results which demonstrate that our model outperforms prior work.
  - **Basic deep learning tools and areas**: Learned basic knowledge and models of supervised Learning (CNN, RNN, GAN, VAE) and reinforcement learning.

- **3-D Graphics and Rendering**   2019 Fall
  - **Project Water Freezing Simulation**: Reproduced prior work by implementing supercooling simulation pipeline in Blender and Colab.
  - **Full pipeline of conventional rasterization and rendering**: Learned full pipeline for conventional 3-D rasterization procedure.

- **Machine Learning From Data**   2018 Fall
  - **Principles of Machine Learning**: Implement and critique published literature and basic models of learning from data, which offers help in formulating learning problem.
  - **Practical Machine Learning Model**: Practice machine learning models on real-world problems by selecting learning model analyzing hypothesis complexity (such as *VC*-bound) and algorithm and measuring efficiency and feasibility of learning.

- **Digital Signal Processing**   2018 Fall
  - **Signal Transformation**: Fortify foundations of digital signal analysis and Discrete-time Fourier Transform, Fourier Series and Z-Transform necessary for hardware design and signal processing.

Skills

- **Programming Languages:** Python, C++, C, Matlab, LaTeX, HTML, JavaScript
- **Software:** Visual Studio, Blender, GitHub, OpenCV, Meshlab, SteamVR, Maya, MS Office, AWS
- **Hardware:** Arduino, Embedded System, HTC Vive, Oculus Rift, AutoCAD, PSpice
- **OS:** Windows, Linux, Mac OS

Work Experience

- **Teaching Assistant (TA)**   USC Los Angeles, CA
  Data Structures and Object Oriented Design   *January 2021 — Present*

- **Teaching Assistant (TA)**   RPI Troy, NY
  Laboratory Introduction to Embedded Control   *September 2016 — May 2019*

- **Electric Energy System Designer**   Nanjing, China
  Jiangsu Longtu Zhaorun Engineering Design Co. Ltd   *July 2017 — August 2017*

Languages

- **Chinese (Mandarin)**
  5 - Native fluency

- **English**
  5 - Bilingual fluency