

Lele Chen

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CURRENT POSITION

- **Sony AI**

Research Scientist

California, CA

Aug. 2023 – Present

- **Generative Data Agent** In this work, we propose a generative agent to dynamically synthesize data during the foundation model adaptation stage to adapt the foundation model to do extremely well on the task at hand. Our approach, called GenDataAgent, explores the target training set and communicates with the model to progressively generate new data that has a similar distribution as the target small-scale dataset on the fly to improve the performance of the target task. In both self-supervised and supervised manners, our GenDataAgent significantly outperforms SOTA methods that augment real data with synthetic data.

PREVIOUS POSITION

- **InnoPeak Technology, Inc.**

Staff Research Scientist

Palo Alto, CA

Feb. 2022 – Jul. 2023

- **Generative AI**

1. We propose a new generative AI video maker: Artistic Video Portrait, for generating artistic portrait videos. This approach transforms a given monocular portrait video into a drivable artistic face video based on text descriptions and conditional inputs (e.g., facial expression parameters, audio) using limited data. Leveraging the spatial density function and color consistency of Neural Radiance Fields (NeRF), and the implicit features of Large Language Models (LLMs), we explore the editing capabilities for dynamic portrait videos. This work is submitted to NeurIPS 2023.
2. We propose an approach that is able to synthesize, edit, and enhance images of an individual with great control over the attributes while preserving the unique facial characteristics of that individual. This work is accepted to SIGGRAPH ASIA 2023.

- **Face Modeling**

We use NeRF to create a synthetic dataset and propose a novel learning strategy that ensures consistency across multiple views, thereby improving the accuracy of 3D facial landmark detection on uncontrolled images. Our proposed 3D-aware module can be seamlessly integrated into any landmark detection algorithm based on learning techniques, enhancing its precision. This work is accepted by CVPR 2023.

- **Egocentric Video Understanding**

We set up an egocentric 3D hand trajectory forecasting task that aims to predict hand trajectories in a 3D space from early observed RGB videos in a first-person view. To fulfill this goal, we propose an uncertainty-aware state space Transformer (USST) that takes the merits of the attention mechanism and aleatoric uncertainty within the framework of the classical state-space model. This work is accepted by ICCV 2023.

- **Dynamic Guardian Virtual Boundary System for VR headset**

I led the initiative to create OPPO's VR headset guardian boundary system, overseeing aspects such as algorithm design, implementation, model quantization, and deployment. The system utilizes the four grayscale cameras on the VR headset to capture the human body pose. Subsequently, our innovative multi-camera multi-instance association algorithm allows us to extract multiple body keypoints from diverse camera views. Following this, a multi-view stereo algorithm is applied to calculate the depth for each keypoint. To enhance accuracy, we employ a self-supervised error check algorithm that filters out inaccurate depth measurements. This process enables us to determine the 3D location of detected intruders and the distance between them and the wearer. Notably, the proposed algorithm demonstrates resilience in various lighting conditions and environments, with an average error of only 0.2 meters.

EDUCATION

- **University of Rochester**

Ph.D. student in Computer Science

Rochester, NY

Sep. 2018 – Feb. 2022

- **University of Rochester**

M.S. in Computer Science

Rochester, NY

Aug. 2016 – Jun. 2018

• **Reutlingen University**
Visiting Student in Informatics

Reutlingen, Germany
Mar. 2015 – Oct. 2015

• **Donghua University**
B.S. in Computer Science

Shanghai, China
Aug. 2012 – May. 2016

RESEARCH INTERESTS

Computer Vision, Computer Graphics, AR/VR, AI Medical

RESEARCH EXPERIENCE

- **URCS** Rochester, NY
Research Assistant *Jan. 2017 - present*
 - **Audio-Visual Understanding**
Advisor: Prof. Chenliang Xu (UR-CS), Prof. Zhiyao Duan (UR-ECE), Prof. Ross Maddox (UR-BME)
We conduct systematic investigations to integrate two modalities (vision and audition) towards a more comprehensive audio-visual scene understanding. Designing algorithms that jointly model audio and visual modalities towards a complete audio-visual scene understanding can enable novel applications, including multimedia (video indexing and scene editing), and healthcare (assistive devices for visually and aurally impaired people).
 - **Medical MRI Image Understanding**
Advisor: Prof. Chenliang Xu (UR-CS), Prof. Axel W. E. Wismller (UR-BME)
Cooperating with UR Medical Center, we develop an efficient and accurate Glioma segmentation algorithm in MRI data to provide valuable assistance for treatment planning and disease progression monitoring for oncological patients.
 - **Image Generation**
Advisor: Prof. Chenliang Xu (UR-CS), Prof. Jiebo Luo (UR-CS)
We propose a texture-preserving image generation model to synthesize human body images based on sketches. In this project, we propose an unsupervised pose flow learning scheme that learns to transfer the appearance details from the source image.

- **Facebook Reality Labs** Pittsburgh, PA
Research Intern *Jul. 2020 - Dec. 2020*
 - **AR/VR Talking Avatar**
Advisor: Prof. Chenliang Xu (UR-CS), Dr. Chen Cao (Facebook), Prof. Fernando De la Torre (CMU)
Outside-in Codec Avatar. We aim at driving the codec avatar using the outside-in cameras, such as Facestar or iPhone, to achieve light-stage playback animation quality.

- **OPPO US Research Center** Palo Alto, CA
Research Intern *May 2019 - Aug. 2019*
 - **3D Human Avatar Digitization**
Advisor: Prof. Chenliang Xu (UR-CS), Dr. Shuxue Quan (OPPO), Dr. Yi Xu (OPPO)
We develop an efficient algorithm to reconstruct 3D human shape avatar from a single RGB image with keeping the realistic texture. We develop a mobile application that demonstrates this capability in AR/VR settings.

- **JDX Silicon Valley Research Center** Sunnyvale, CA
Research Intern *May 2018 - Aug. 2018*
 - **Perception Module for Autonomous Delivery Robot**
Advisor: Prof. Chenliang Xu (UR-CS), Dr. Hongda Mao (JD.com), Dr. Victor Zhu (JD.com)
We develop a real-time algorithm to process image and Lidar data and output the vehicle/pedestrian/traffic-light detection results to the planning module.

- **VisualDX** Rochester, NY
Research Intern *May 2017 - Sep. 2017*
 - **Medical Image Analysis**
Advisor: Prof. Chenliang Xu (UR-CS), Prof. Jiebo Luo (UR-CS), Dr. Art Papier (VisualDX)
We build several deep neural networks to classify skin diseases, skin lesions, and their anatomical locations, which was developed into an ios App.

PUBLICATIONS

- Anonymous. *Tri²-plane: Thinking Head Avatar via Feature Pyramid.* **Submitted to ECCV 2024**
- Anonymous. *NeRF-Art++: Optimize Drivable Avatar with Instruction Direction.* **Submitted to ECCV 2024**
- T. Luan, Z. Li, L. Chen, X. Gong, **L. Chen**, Y. Xu, J. Yuan. *Spectrum AUC Difference: Human Aligned 3D Shape Evaluation.* **CVPR 2024**
- L. Zeng, **L. Chen**, Y. Xu, N. Kalantari. *MyStyle++: a Controllable Personalized Generative Prior.* **SIGGRAPH Asia 2023**
- W. Bao, **L. Chen**, L. Zeng, Z. Li, Y. Xu, J. Yuan, Y. Kong. *Uncertainty-aware State Space Transformer for Egocentric 3D Trajectory Forecasting.* **ICCV 2023**
- Z. Chen, Z. Li, L. Song,, **L. Chen**, J. Yu, J. Yuan, Y. Xu. *NeuRBF: A Neural Fields Representation with Adaptive Radial Basis Functions.* **ICCV 2023**
- L. Song, Z. Li, X. Gong, **L. Chen**, Y. Xu, J. Yuan. *Harnessing Low-Frequency Neural Fields for Few-Shot View Synthesis.* **In Submission**
- **L. Chen**, G. Cui, Z. Kou, H. Zheng, C. Xu. *What comprises a good talking-head video generation?: A Survey and Benchmark.* **In Submission**
- L. Song, A. Chen, Z. Li, C. Zhang, **L. Chen**, J. Yuan, Y. Xu, A. Geiger. *NeRFPlayer: A Streamable Dynamic Scene Representation with Decomposed Neural Radiance Fields.* **TVCG 2023**
- L. Zeng, **L. Chen**, W. Bao, Z. Li, Y. Xu, J. Yuan, N. Kalantari. *3D-aware Facial Landmark Detection via Multiview Consistent Training on Synthetic Data.* **CVPR 2023**
- C. Cao, V. Agrawal, F. De la Torre, **L. Chen**, J. Saragih, T. Simon, Y. Sheikh. *Real-time 3D Neural Facial Animation from Binocular Video.* **(SIGGRAPH 2021)(Transaction on Graphics)**
- **L. Chen**, C. Cao, F. De la Torre, C. Xu, J. Saragih, Y. Sheikh. *High-fidelity Face Tracking for AR/VR via Deep Lighting Adaptation.* **(CVPR 2021)**
- Z. Li, **L. Chen**, C. Liu, F. Zhang, Z. Li, Y. Gao, Y. Ha, C. Xu, S. Quan, Y. Xu. *Animated 3D human avatars from a single image with GAN-based texture inference.* **(Computers & Graphics 2021)**
- **L. Chen**, G. Cui, C. Liu, Z. Li, Z. Kou, Y. Xu, C. Xu. *Talking-head Generation with Rhythmic Head Motion.* **(ECCV 2020)**
- H. Zheng, H. Liao, **L. Chen**, W. Xiong, T. Chen, and J. Luo. *Example-Guided Scene Image Synthesis using Masked Spatial-Channel Attention and Patch-Based Self-Supervision.* **(ECCV 2020)**
- H. Zheng, **L. Chen**, C. Xu and J. Luo. *Texture Preserving Flow for Pose Guided Synthesis.* **(IEEE TIP 2020)**
- Y. Gan, Y. Qiu, **L. Chen**, J. Leng, Y. Zhu. *Low-Latency Proactive Continuous Vision.* **Best Paper Nominee (PACT 2020)**
- **L. Chen**, G. Cui, Z. Kou, H. Zheng, C. Xu. *What comprises a good talking-head video generation?.* **(CVPRW 2020)**
- Z. Li*, **L. Chen***, C. Liu, Y. Gao, Y. Ha, C. Xu, S. Quan, Y. Xu. *Human Shape Avatar Digitization at a Glance. (*: equal contribution)* **Best Paper Award (SIGGRAPH VRCAI 2019)**
- **L. Chen***, J. Tian *, G. Li, C. Wu, E. King, K. Chen, S. Hsieh, C. Xu. *TailorGAN: Making User-Defined Fashion Designs.* **Oral (WACV 2020)**
- **L. Chen**, H. Zheng, R.K. Maddox, Z. Duan, C. Xu. *Sound to Visual: Hierarchical Cross-Modal Talking Face Video Generation.* **Spotlight (CVPRW 2019)**
- **L. Chen**, R. Maddox, Z. Duan, C. Xu. *Hierarchical Cross-modal Talking Face Generation with Dynamic Pixel-wise Loss.* **(CVPR 2019)**
- **L. Chen***, Z. Li*, R.k. Maddox, Z. Duan, C. Xu. *Lip movements generation at a glance.* **Demo (ECCV 2018)**
- **L. Chen**, E. Eskimez, Z. Li, Z. Duan, C. Xu, R.K. Maddox. *Toward a visual assistive listening device: Real-time synthesis of a virtual talking face from acoustic speech using deep neural networks.* **(JASA 2018)**
- **L. Chen**, Y. Wu, A.M. DSouza, A.Z. Abidin, C. Xu, A. Wismler. *MRI Tumor Segmentation with Densely Connected 3D CNN.* **Oral (SPIE 2018)**
- **L. Chen***, S. Srivastava*, Z. Duan, C. Xu. *Deep Cross-Modal Audio-Visual Generation.* **(ACMMM 2017)**

HONORS & AWARDS

29th Int. Conference on Parallel Architectures and Compilation Techniques Best Paper Nominee	2020
Donald M. and Janet C. Barnard Fellowship	2020
17th ACM SIGGRAPH VRCAI Best Paper Award	2019
CIRC Poster Session Best Poster Award	2017
Scholarship by University of Rochester (30% of tuition)	2016
Bronze Medal of Mathematical Contest in Modeling of Shanghai	2014
Scholarship for Academic Excellence	2013
Jinbao Scholarship for Top 10 Students	2013
Bronze Medal of ACM Contest of Donghua University	2013

UNIVERSITY SERVICES

- **Teaching Assistant**
 - Spring 2020 CSC261/461: Intro. to Databases
 - Spring 2019 CIS418: Advanced Business Modeling & Analysis
 - Winter 2018 CSC261/461: Database Systems
 - Fall 2017 GBA464: Programming for Analytics
 - Fall 2019 CSC577: Advanced Topics in Computer Vision
 - Winter 2018 CIS442: Data Management for Analytics
 - Spring 2018 CIS442F: Big Data
- **PhD Admission Committee** Feb. 2020
(CS, University of Rochester)
- **Student Advising**
 - **MS Students** Purvanshi Mehta (UR-DS), Justin Tian (UR-CS), Ziyi Kou (UR-CS), Guofeng Cui (UR-CS), Guo Li (UR-CS)
 - **Undergraduate Students** Canruo Zou (UR-CS)

INVITED TALKS

- From Image Generation to Video Generation
- NSF NRT mini-conference, University of Rochester Sep. 2019
- Combination of Generative Adversarial Network and 3D Graphics Modeling
- JD AI Research Aug. 2019
- Sound to Visual: Hierarchical Cross-Modal Talking Face Generation
- Sight & Sound Workshop, CVPR 2019 Jun. 2019
- Cross-Modal Audio-Visual Generation
- VISTA Lab, University of Rochester Apr. 2017

LEADERSHIP

- Rochester Vision Group, Lab Manager Nov. 2017 - Feb. 2022
- Maintain the GPU Cloud Computing Server at the hardware level and system-level. Suggest the new server purchase (up to \$50,000).
Manage the Cloud Computing Server accounts for new lab researchers and create new environments for their research.
- CSC261 Teaching Assistant Group, Leader Winter 2018, Spring 2020
- Create and design the course project for CSC261 (45% of the final grade). Demonstrate lecture tutorials and reviews. Create and manage department SQL Web Server to hold student's websites. Coordinate other TAs' TA hours, teaching sessions, etc.
- University Youth League, Vice President Jun. 2013 - Dec. 2015
- Coordinate company visits, and schedule events. Oversee budgeting of other officers, orchestrate fundraising activities, and purchase and select prizes and food for in-house events.

VOLUNTEER WORK

- Graduate Student Association (GSA) Department Representative Sep. 2020 - Sep. 2021
The GSA advocates on behalf of our students to the University's administration, connects students to each other and University resources and organizes activities that promote personal, academic, and career success during graduate school.
- Volunteered Lecture 10 hours
Demonstrate several tutorial lectures per year(2018-2020) to different URCS courses on GPU cloud server usage, artificial intelligence research, website design and database design, etc.

- URCS Department Cleaning Committee

Sep. 2019 - Feb. 2022

- Member of URCS cleaning committee (2019-2020). The core tasks are throwing out spoiled or unlabeled food in both the 3rd-floor and grad lounge fridges and wiping them down, cleaning the microwaves in those two spaces, and cleaning the countertops in the kitchen.