Mingfei Chen

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EDUCATION

Huazhong University of Science and Technology Sep 2016 - Jun 2020
Computer Science and Technology Bachelor Wuhan, China

- GPA: 3.96 / 4.00
- Honors & Awards:
  - Huazhong University of Science and Technology Undergraduate Excellent Student (Top 1% in 35000)
  - Huazhong University of Science and Technology Merit Student Scholarship

University of Washington, Seattle Sep 2021 - Mar 2023
Electrical and Computer Engineering Master Seattle

- GPA: 3.99 / 4.00

RESEARCH EXPERIENCE

NeuroAI Lab, University of Washington, Seattle Jan 2022 - Present
Advisor: Eli Shlizerman Seattle

Project: **Implicit Neural Acoustic Representation**

- Proposed a novel approach, INRAS, to learn the implicit neural representation for audio scenes that produce high fidelity time-domain impulse responses at arbitrary emitter-listener positions in the scene.
- Introduced a novel audio scene feature decomposition, which leads to efficient reuse of scene-dependent features for any arbitrary emitter-listener positions.
- INRAS outperforms existing approaches on all metrics of audio rendering, including the impulse response quality, inference speed, and storage requirements. INRAS is also robust and capable of generalizing across multiple scenes with a few additional parameters.
- The paper has been submitted to NeurIPS 2022.

Project: Few-shot Visual-guided High-fidelity Audio Rendering

- Exploring visual-guided algorithm to render audio at arbitrary listener positions, only with a few observation points.

National University of Singapore & Sea AI Lab Jun 2021 - Nov 2021
Advisor: Shuicheng Yan, Jiashi Feng Singapore

Project: Controllable High-Fidelity 3d Human Modeling (High-fidelity 3D Rendering)

- Developed NeRF-based controllable high-fidelity modeling algorithm for 3d humans, using 2D images under several views.
- Proposed one effective and efficient model to render different persons, with high generalization ability. Improved the mesh rendering accuracy and the RGB fidelity.
- Collected and processed a large-scale dataset for pretraining, and explored online self-supervised fine-tuning strategies on the real-life dataset, under 3 cameras with an angle of 120 degrees to each other.
- Our method outperforms the state-of-the-arts significantly across multiple generalization settings, while the time cost is reduced > 70% via applying our efficient progressive rendering pipeline.
- The paper has been accepted to ECCV2022

Sensetime & University of Washington, Seattle Nov 2020 - Jun 2021
Advisor: Jenq-Neng Hwang Beijing, China

Project: Online Multi-object Tracking (MOT)

- Proposed a novel online MOT framework that allowed the detection and association process to aggregate features according to their different requirements respectively.
- Designed a reliable track association module that predicted the motion and representative appearance embedding for each track, and then jointly performed the location and appearance matching based on them.
- The new method improves the association effectiveness and also keeps competitive detection accuracy, reaches SOTA performance on MOT17 as an online MOT tracker.

Sensetime & Beihang University Jul 2020 - Nov 2020
Advisor: Si Liu Beijing, China

Project: Human-object Interaction (HOI)

- Formulated HOI detection as a set prediction problem as the primary researcher. The new formulation breaks the instance-centric and location limitations of the existing methods.
- Proposed a novel one-stage HOI framework with transformer to adaptively aggregate the most suitable features. Designed an instance-aware attention module to introduce the instance information into the interaction branch.
- Without introducing any extra features, our method achieves 31% relative improvement over the second-best one-stage method on the HICO-DET dataset especially.
- The paper has been accepted to CVPR2021.

University at Buffalo-SUNY & Chinese University of Hong Kong, Shenzhen Jul 2019 - Nov 2019
Advisor: Chang Wen Chen, Junsong Yuan Shenzhen, China
Project: Cross-modal Video Retrieval (Vision Language)

- Addressed the natural language video retrieval efficiency and effectiveness problem as the primary researcher.
- Devised a temporal anchor-free structure that performed retrieval directly on each temporal location within the target region. Built a top-down pyramid structure to make use of diverse temporal receptive fields, and a dilated convolutional module to integrate vision-language features more comprehensively.
- The new method reduces retrieval time by a factor of 5 and outperforms previous work by 10% on retrieval accuracy.
- Outstanding undergraduate graduation thesis.

TEACHING EXPERIENCE

UW SP22 EE 596: Introduction to Deep Learning Applications and Theory Mar 2022 - Jun 2022
Graduate Teaching Assistant Seattle

- Hold the lab sessions, introduce the knowledge background, examples and instructions of the weekly lab assignments.
- Conduct quiz sections as scheduled for the course, grade the quiz and lab assignments.
- Prepare, maintain, and update webpage, electronic discussion boards, Monitor and resolve administrative, grading, or other issues related to course.

INTERNSHIP EXPERIENCE

Sea Jul 2021 - Nov 2021
AI Lab Singapore

• Developed controllable photo-realistic modeling service for 3d humans based on NeRF, using 2D human images under several views. Improved the effectiveness, efficiency and generalization ability.

• Deployed the new model to the real scenario with 3 rgb cameras for real human rendering and acheived good quality even on the unseen scenarios.

SenseTime Jul 2020 - Jul 2021
Sensetime Research Beijing, China

- Conducted research on visual relation recognition, such as Human-object Interaction and Multi-object Tracking.
- Applied the proposed method in research to the real-life application scenario (e.g., dangerous action recognition in the intelligent car) and further optimized the model based on the real-life data.

ByteDance (TikTok) Sep 2019 - Apr 2020
AI Lab Computer Vision Group Shenzhen, China

- Reconstructed the hand pose detection network with a lightweight backbone. Finetuned and validated the new model based on millions of real-life user data, ensuring the high run speed while maintaining the comparatively robust detection precision.
- Improved detection and segmentation performance for humans, especially under distant multi-person scenarios.

PUBLICATIONS

- [1] **Mingfei Chen***, Yue Liao*, Si Liu, Zhiyuan Chen, Fei Wang, Chen Qian. "Reformulating HOI Detection as Adaptive Set Prediction." Computer Vision and Pattern Recognition (CVPR), 2021.
- [2] **Mingfei Chen**, Jianfeng Zhang, Xiangyu Xu, Lijuan Liu, Yujun Cai, Jiashi Feng, Shuicheng Yan. "Geometry-Guided Progressive NeRF for Generalizable and Efficient Neural Human Rendering." European Conference on Computer Vision (ECCV), 2022.
- [3] Kun Su, **Mingfei Chen**, Eli Shlizerman. "INRAS: Implicit Neural Representation for Audio Scenes." Under review, NeurIPS 2022.
- [4] **Mingfei Chen**, Yue Liao, Si Liu, Fei Wang, Jenq-Neng Hwang. "TR-MOT: Multi-Object Tracking by Reference." ArXiv preprint, 2022.

MISCELLANEOUS

- **Skills:** C/C++, Python, Matlab, PyTorch