MINGFEI CHEN

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EDUCATION

University of Washington   Sep 2021 - Jun 2023
M.S. in Electrical and Computer Engineering, GPA: 3.99/4.00   *Seattle, WA*

Huazhong University of Science and Technology   Sep 2016 - Jun 2020
B.S. in Computer Science and Technology, GPA: 3.96/4.00   *Wuhan, China*
Undergraduate excellent student and outstanding undergraduate graduation thesis awards.

RESEARCH PROJECTS

NeuroAI Lab, University of Washington, Seattle   Dec 2021 - Present
Advisor: Eli Shlizerman   *Seattle, WA*
Project: Audio Scene Reconstruction by Sparse Audio-Visual Samples (CVPR23 Under Review)

- Developed an end-to-end integrated rendering pipeline BEE to address audio reconstruction at arbitrary listener locations for dynamic scenes by sparse audio-visual samples.

- Constructed an effective Joint Audio-Visual Representation module that can learn an audio-visual representation of the scene, and an Integrated Rendering Head module to synthesize the target listener sound by learning time-frequency transformations to integrate the audio samples based on the audio-visual scene representation.

- BEE outperforms existing methods by a large margin in the quality ability to generalize to various scenes and runs in the real-time speed of 37fps.

Project: Implicit Neural Acoustic Representation (NeurIPS22)

- 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 the 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.

National University of Singapore & Sea AI Lab   Jun 2021 - Nov 2021
Advisor: Shuicheng Yan, Jiashi Feng   *Singapore*
Project: Controllable High-Fidelity 3D Human Rendering Under Sparse Views (ECCV22)

- Proposed a novel geometry-guided progressive NeRF for generalizable and efficient human body rendering, which significantly reduces the computational cost of rendering and also gains higher generalization capacity simply based on the single-frame sparse views (3 cameras with an angle of 120 degrees to each other.).

- Introduced an effective geometry-guided multi-view feature integration approach, which allows each view to compensate for the low-quality occluded information for other views with the guidance of the geometry prior.

- The proposed method outperforms the state-of-the-arts significantly, taking only 175ms on RTX 3090 and reducing time for rendering per image by over 70%.

- Collected and processed a large-scale dataset for pretraining, and verified the robustness of the proposed method on real scenarios.

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 each track's motion and representative appearance embedding, and then jointly performed the location and appearance matching based on them.

- The proposed method improves the effectiveness of the association and keeps competitive detection accuracy, reaching SOTA performance on MOT17 as an online MOT tracker.

Sensetime Research   Jul 2020 - Mar 2021
Advisor: Si Liu   *Beijing, China*
Project: Human-Object Interaction (HOI) Detection (CVPR21)

- 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 a 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.

PUBLICATIONS

[1] **Mingfei Chen**, Kun Su, Eli Shlizerman. "Be Everywhere - Hear Everything (BEE): Audio Scene Reconstruction by Sparse Audio-Visual Samples." Under review, CVPR 2023.
[2] Kun Su*, **Mingfei Chen***, Eli Shlizerman. "INRAS: Implicit Neural Representation for Audio Scenes." Neural Information Processing Systems (NeurIPS), 2022.
[3] **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.
[4] **Mingfei Chen**, Yue Liao, Si Liu, Fei Wang, Jenq-Neng Hwang. "TR-MOT: Multi-Object Tracking by Reference." ArXiv preprint, 2022.
[5] **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.
(* means equal contribution.)

TEACHING EXPERIENCE

UW SP22 EE596: Introduction to Deep Learning Applications and Theory   Mar 2022 - Jun 2022
Graduate Teaching Assistant   *Seattle, WA*

- Hold the lab sessions, introduce the knowledge background, examples and instructions of weekly lab assignments.

- Conduct quiz sections as scheduled for the course, grade the quiz and lab assignments.

- Prepare and maintain the class webpage and electronic discussion boards.

- Monitor and resolve administrative, grading, or other issues related to the 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 sparse views. Improved the effectiveness, efficiency and generalization ability.

SenseTime Jun 2020 -Jun 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 a high run speed while maintaining comparatively robust detection precision.
- Improved detection and segmentation performance for humans, especially under distant multi-person scenarios.

AWARDS & HONORS

[2022] University of Washington Graduate School Conference Presentation Award.

[2020] Huazhong University of Science and Technology Outstanding undergraduate graduation thesis.

[2018, 2019] Huazhong University of Science and Technology Merit Student Scholarship.

[2018] Meritorious Winner of Mathematical Contest In Modeling (MCM/ICM).

[2017] Huazhong University of Science and Technology Undergraduate Excellent Student (Top 1% in 35000).

SKILLS

Programming	Python, Matlab, C/C++
DevOps	Pytorch, Linux, docker
Research	Audio-Visual Representation, 3D Visual Synthesis, Visual Relation Recognition
Reviewer	AAAI2023
Student Organizer	University of Washington NeuroAI Seminar