Huaizhi Qu

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Education

B.E. in Computer Science, **University of Science and Technology of China (USTC)** Aug. 2018 - July 2024
Majored in Theoretical Physics (2018 - 2021) and later switched major to Computer Science (2021~2024)
GPA (computer science relevant): **3.62/4.3**
Core Courses: Parallel Computing (90/100), AI in Geoscience (95/100), Quantum Computing and Machine Learning (87/100), Operating System (85/100), Computer Organization (87/100), Operational Research I: Basis (90/100), General Relativity (99/100), Relativistic Astrophysics (95/100)
TOEFL: 107 (Reading 30, Listening 28, Speaking 23, Writing 26)
GRE: 329 + 3.5 (Verbal 159, Quantitative 170)
Scholarship: Outstanding Student Scholarship 2018
Outstanding Student Scholarship 2021

Research Interest

3D Vision, NeRF, Neural Rendering, Efficient Deep Learning, System for AI, AI for System.

Publication

GPU Occupancy Prediction of Deep Learning Models Using Graph Neural Network
Huaizhi Qu[*], Hengquan Mei[*], Jingwei Sun[†], Yanjie Gao, Haoxiang Lin, Guangzhong Sun
IEEE International Conference on Cluster Computing (**Cluster**), 2023

MarryRecon: Marry Radiance Fields and Meshes Towards Efficient 3D Reconstruction and Rendering
Zhifan Ye, Yonggan Fu, Chaojian Li, Haoran You, Sixu Li, **Huaizhi Qu**, Celine Lin
Submitted to 38th AAAI Conference on Artificial Intelligence (**AAAI**)
[*] denotes equal contribution

Research Experiences

Undergraduate Research, EIC Lab, Georgia Tech Jan. 2023 - Present
Advisor: Professor **Yingyan (Celine) Lin** (Associate Professor in the School of Computer Science, Georgia Tech)
Generalizable Multitask NeRF

- For the first time identified severe negative transfer across multiple 3D tasks building upon NeRFs.
- Developed a pipeline that utilizes monocular priors through appearance blending.
- Innovated a NeRF backbone with decoupled geometry and appearance branches, resulting in a 2% mIoU improvement in the segmentation task.
- Proposed a multiview consistency regularization and a gradient surgery scheme to enhance model performance.

Fast NeRF Training and Rendering

- Studied the latest advancements in SOTA techniques for accelerating NeRF training and rendering from research papers.
- Conducted experiments to identify model architectures that achieve faster training time without compromising performance.

Undergraduate Research, Algorithm and Data Application Lab, USTC Aug. 2022 - May 2023
GPU Occupancy Prediction of Deep Learning Models Using Graph Neural Network
Advisor: Professor **Guangzhong Sun** (Professor of School of Computer Science and Technology, USTC)

- Proposed a Graph Transformer based approach to predict GPU occupancy, and experiments showed that the approach is accurate (MRE 9.27%) and has a strong generalizability (MRE 5.50%).
- Utilized Nsight Compute to profile various models and collect occupancy data for training.
- Conducted extensive experiments to evaluate Transformer-based models and Clip models to verify the accuracy and generalizability of the approach, and results showed that our model outperforms baseline models (at least 60% more accuracy) and can generalize across different models of GPUs.
- Designed a scheduling strategy using predicted occupancy to guide distribution of inference tasks across GPUs and achieved shorter job completion time.

Competition, Baidu KDD Cup 2022 July 2022

Advisor: Professor **Defu Lian** (Professor of School of Data Science, USTC)

- Did a literature survey about the latest advancements in time series forecasting.
- Empirically evaluated the performance across different time series forecasting models, e.g. XGBoost, temporal fusion transformer (TFT) and N-BEATS.
- Proposed to encode turbines with provided positions and achieved better performance.
- Ranked 52/2490 after the final phase of competition.

Course Final Project, AI in Geoscience Jan. 2022

Advisor: Professor **Xinming Wu** (Professor of School of Earth and Space Sciences, USTC)

- Applied image classification models including ResNet, ResNext and ViT to classify different kinds of rocks.
- Designed data augmentation strategy to achieve better accuracy according to intrinsic attributes of the images.
- Ranked 2/12 in 12-class track and 3/38 in 3-class track.

Skills

Proficient in Python, PyTorch, Git, HuggingFace, C, C++;
Solid knowledge in basic neural network;
Knowledge in modern deep learning techniques, including DETR, contrastive learning.