Haoming Liu

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EDUCATION

New York University Shanghai   Expected graduation time: May 2023
Bachelor of Science in Computer Science, Minor in Mathematics
Cumulative GPA: 3.91/4.00 | Major GPA: 3.95/4.00
Selected Coursework: Computer Vision (A), Deep Learning (A), Machine Learning for Language Understanding (A),
        Artificial Intelligence (A), Information Visualization (A), Algorithms (A), Data Structures (A)
Scholarship: NYU-SH Dean's List for Academic Year 2019 - 2021, NYU-SH Research Assistant Funding 2021 & 2022
        NYU-SH Dean's Undergraduate Research Funding 2020 & 2021

PUBLICATION & PREPRINT

[1] **Haoming Liu***, Li Guo*, Zhongwen Zhou, and Hanyuan Zhang. Pyramid-Context Guided Feature Fusion for RGB-D Semantic Segmentation. *Proceedings of the 2022 IEEE International Conference on Multimedia and Expo Workshops (ICMEW)*, 2022. [URL]

[2] **Haoming Liu***, Li Guo*, Chengyu Zhang, Xiaochen Lu, Yuxuan Xia, and Zhenxing Niu. Boosting Few-Shot Segmentation via Instance-Aware Data Augmentation and Local Consensus Guided Cross Attention. *To be submitted to CVPR 2023.*

RESEARCH

Few-Shot Segmentation with Adaptive Data Augmentation and Cross Attention

Research Assistant advised by Professor Li Guo   NYU Shanghai, May 2022 – Present

• Probe an instance-aware data augmentation strategy to improve the diversity of support images and reduce the distribution inconsistency between support and query images.

• Formulate a cross attention module via 4D dense correlation and local consensus constraints to align query features with support features and improve the model's generalization ability.

• Co-author a paper (as the **1st author**) which will be submitted to the conference of **CVPR 2023.**

RGB-D Semantic Segmentation via Pyramid-Context Guided Feature Fusion

Research Assistant advised by Professor Li Guo   NYU Shanghai, May 2021 – March 2022

• Devise a strong and efficient two-branch baseline model for RGB-D semantic segmentation.

• Explore a feature fusion paradigm to adaptively refine and aggregate feature maps by incorporating the contextual information at various scales. Our network adopts such a paradigm for multi-modal and multi-level feature fusion at multiple stages, which archives SOTA performance on all RGB-D semantic segmentation benchmarks.

• Publish a paper (as the **co-1st author**) at the 3DMM workshop of **ICME 2022**.

RepMAF: A Re-parameterizable Building Block for Multi-scale Feature Extraction

Course Project mentored by Professor Rob Fergus   NYU, October 2021 – December 2021

• Devise a building block with multiple branches extracting features at different scales, where each branch adopts the RepVGG block and can be converted to a more hardware-friendly architecture at inference time. Use channel-wise attention to adaptively integrate the output feature maps from each branch.

• Achieve remarkable performance gain and moderate inference speed compared to multiple baselines.

Evaluating Parameter-Efficient Tuning Methods in Low-Data Regimes

Course Project mentored by Professor Sam Bowman   NYU, March 2022 – May 2022

• Reproduce four SOTA parameter-efficient tuning methods based on the HuggingFace and OpenDelta libraries.

• Evaluate the performance of these methods on various natural language understanding tasks (i.e., sentiment analysis, natural language inference, reading comprehension, and Q&A) with different portions of training samples provided.

• Verify that a parameter-efficient tuning method with a larger ratio of tunable parameters generally results in a better performance across multiple NLU tasks but usually converges slower, regardless of the sufficiency of data.

PROJECT

Semi-supervised Object Detection Competition   NYU, April 2022 – May 2022

• Perform Masked Autoencoder (MAE) pre-training on a ViT-base model using 512K unlabeled images (ImageNet subset, of size 224×224). Fine-tune the backbone with 5K labeled images (train:val=3:2, 100 classes in total), where a plain FPN from ViTDet and a standard Faster R-CNN detection head is adopted as the predictor.

• Achieve 30.3% mAP on the hidden test set and is ranked the 3rd among 21 teams. This competition is held in the graduate-level deep learning course, supervised by *Professor Yann LeCun* and *Professor Alfredo Canziani*.

Contract Parsing and Key Information Extraction   NYU Shanghai, July 2021 – September 2021

 • Parse the contracts (in Chinese) for an urban construction corporation. Extract key information via the Tesseract OCR engine and template matching, store them in a MySQL database, and build a set of online APIs using Flask.

Daily Life Tracking & Visualization   Anywhere, September 2020 – Present

 • Record all my activities on Google Calendar and label them into four categories: Work, Rest, Neutral, and Sleep.

 • Export the data regularly for visualization purposes, which gives insights about my work-life balance and helps me make better use of my time. Some visualizations can be found here.

OTHER EXPERIENCE

Machine Learning Course Assistant (STEM Lead)   NYU Shanghai, September 2022 – Present

 • Hold weekly office hours and review sessions to facilitate students' learning.

 • Co-facilitate course assistant training and provide feedback to program supervisors regularly.

Information Visualization Course Assistant   NYU Shanghai, January 2021 – May 2021

 • Hold weekly office hours and review sessions to facilitate students' learning.

Computer & Data Science Club President   NYU Shanghai, June 2020 – June 2021

 • Recruit over 100 club members and hold weekly activities (*e.g.*, workshop series, hackathon, gatherings, etc.).

OTHER INFORMATION

Skills: Python, C, HTML, Javascript, CSS, Linux, Git, LaTeX, Slurm, Markdown

Languages: Native in Mandarin, Working proficiency in English

Hobbies: Yi Jing(I Ching), Guqin, Guitar, Jogging

Last Update: October 2022