

# Haoming Liu

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## EDUCATION

**New York University Shanghai**

September 2019 – May 2023 (expected)

**New York University (Study Away Program)**

September 2021 – May 2022

*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 the 2023 IEEE/CVF Conference on Computer Vision and Pattern Recognition (CVPR)*.

## 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 the 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.
- Setup a comprehensive and reusable codebase for few-shot segmentation research ([available on GitHub](#)).
- Co-author a paper (as the **1<sup>st</sup> 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 applies such a paradigm to both multi-modal and multi-level feature fusion and archives SOTA performance on all RGB-D semantic segmentation benchmarks.
- Setup a comprehensive and reusable codebase for RGB-D semantic segmentation research ([available on GitHub](#)).
- Publish a [paper](#) (as the **co-1<sup>st</sup> 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 Courant, 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 compared to multiple baselines of similar scales (*e.g.*, VGG, RepVGG, etc.) on the CIFAR-10 dataset with a moderate inference speed.

### Evaluating Parameter-Efficient Tuning Methods in Low-Data Regimes

Course Project mentored by [Professor Sam Bowman](#)

NYU Center of Data Science, 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

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### Semi-supervised Object Detection (Course Competition)

NYU Courant, 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 3K labeled images from 100 classes, where a plain FPN from ViTDet and a standard Faster R-CNN detection head are adopted as the predictor.
- Achieve 30.3% mAP on the hidden test set and is ranked 3<sup>rd</sup> among 21 class teams. This competition is held in the graduate-level deep learning course, supervised by [Professor Yann LeCun](#) and [Professor Alfredo Canziani](#).

### Contract Parsing & 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 Logging & Visualization

Everywhere, September 2020 – Present

- Record all my activities on Google Calendar and assign category labels (*i.e.*, work, rest, neutral, and sleep).
- Export the data regularly and visualize them using D3.js and React, which gives insights about my work-life balance and helps me make better use of my time. Some visualizations can be found [here](#).

### Real-time Face Mask Detection with YOLO v4

NYU Shanghai, September 2020 – December 2020

- Train a YOLO v4 model on a Kaggle dataset to perform real-time face mask detection (*i.e.*, masked or unmasked).

### Large-parallax Image Stitching via Sub-plane Segmentation

NYU Shanghai, July 2020 – September 2020

- Align and stitch images with large parallax based on SIFT features and K-Means guided sub-plane division.
- Achieve satisfactory qualitative results and a close-to-SOTA performance (by SSIM measure) over 37 image pairs.

### Encrypted Chat System & Cloud Drive

NYU Shanghai, November 2019 – December 2019

- Introduce Fernet encryption to a chat system powered by TCP sockets. Implement a set of cloud drive functionalities through the FTP protocol (*e.g.*, uploading, downloading, sharing, memory-efficient storage, encryption, etc.).

## TEACHING & LEADERSHIP

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### Machine Learning Course Assistant (STEM Lead)

NYU Shanghai, September 2022 – Present

- Hold weekly review sessions and office hours to help students digest course materials.
- Co-facilitate course assistant training and provide feedback to program supervisors regularly.

### Information Visualization Course Assistant

NYU Shanghai, January 2021 – May 2021

- Hold weekly review sessions and office hours to help students digest course materials.
- Receive the “Outstanding Communication Award” at the end of the semester.

### 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.).
- Co-host the “[Love Data Week Datathon](#)” event series with the NYU Data Science Club.

## SKILL & INTEREST

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

**Language Skills:** Native in Mandarin, Working proficiency in English

**Interests:** Yi Jing(I Ching), Guqin, Guitar, Pool, Jogging

Last Update: October 2022