Mengqi Guo

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EDUCATION

School of Computing, National University of Singapore (NUS), Singapore   August 2021 – Present

➤ I am a Ph.D. candidate at Computer Vision and Robotic Perception Laboratory at NUS, advised by Prof. Gim Hee Lee.

➤ Interests: My research interests lie in computer vision and machine learning, especially in sequential 3D Reconstruction and Understanding, including **Reconstruction** (incremental neural implicit reconstruction), **Assembly** (sequential brick assembly), and **Animation** (articulated neural object reconstruction).

Shenyuan Honors College, Beihang University (BUAA), Beijing, China   August 2017 – June 2021

➤ B.S. in Computer Science, Overall GPA: 3.51/4.0, Major GPA: 3.6/4.0

➤ Core Courses: Optimization in Computer Engineering (99); Compiling Technology Project (95); Advanced Algebra (95); Operating System Project (92); Data Structure (91); Mathematical Analysis (91); Electronic Commerce (91); Object-Oriented Design (90); Algorithm Design and Analysis (90); Computer Network Security Technology (A)

➤ Self-study Courses: CS231A (Stanford), CS231N (Stanford), Machine Learning (Andrew Ng, Stanford)

PUBLICATION

Hanlin Chen, Chen Li, **Mengqi Guo**, Zhiwen Yan, Gim Hee Lee. "*GNeSF: Generalizable Neural Semantic Fields*", **NeurIPS 2023.**

Mengqi Guo, Chen Li, Hanlin Chen, Gim Hee Lee. "*Incremental Neural Implicit Representation with Uncertainty-Filtered Knowledge Distillation*", Arxiv 2022. https://arxiv.org/abs/2212.10950

Qing Liu, Adam Kortylewski, Zhishuai Zhang, Zizhang Li, **Mengqi Guo**, Qihao Liu, Xiaoding Yuan, Jiteng Mu, Weichao Qiu, Alan Yuille. "*Learning Part Segmentation Through Unsupervised Domain Adaptation From Synthetic Vehicles*", **CVPR 2022 (Oral).** https://arxiv.org/abs/2103.14098

Mengqi Guo, Yutong Bai, Zhishuai Zhang, Adam Kortylewski, Alan Yuille. "*Unsupervised Part Discovery via Feature Alignment*", Arxiv 2020. https://arxiv.org/abs/2012.00313

RESEARCH EXPERIENCE

Compositional Cognition, Vision, and Learning, Johns Hopkins University | *Research Assistant*   June 2020 – June 2021

Project: Unsupervised Part Discovery via Feature Alignment

Advisor: Alan Yuille, Bloomberg Distinguished Professor of Cognitive Science and Computer Science, JHU

➤ Proposed a novel algorithm to find similar image sets and align them by matching the feature maps; proposed a novel mechanism to generate pseudo ground-truth via voting from the companion images; used the pseudo ground-truth to guide the feature map

➤ Achieved state-of-the-art part detection on different datasets (vehicle, bird, human face), and our ablation study proved that our idea about feature alignment is effective

Research Institute, Megvii (Face++) | *Research Intern*   October 2019 – July 2020

Project: Vehicle 3D Reconstruction and Camera Self-Calibration, https://github.com/dreamguo/show_my_work

Advisor: Ziyao Xu, Leader of the 3D vision-group in Research Institute, Megvii (Face++)

➤ Participated in the reconstruction of three-dimensional key points of multiple car models and used the least square method to solve the minimum reprojection error; achieved an average reprojection error of 3-5 pixels for each model

- Calibrated the camera with car models, analyzed the correlation between different representation errors and real errors, and optimized methods; achieved an error of the camera parameters of 2.5-4.0%
- Completed self-calibration with PyTorch and implemented the original OpenCV-based method with PyTorch, optimized to achieve better results

National Engineering Laboratory for Video Technology, Peking University | *Research Assistant*   June – November 2019
Project: Evaluation of Surgical Levels Through Surgical Video, https://github.com/dreamguo/EndoVis2019
Advisor: Tingting Jiang, Associate Professor at School of Electronics Engineering and Computer Science, Peking University
- Extracted the RGB and optical flow features in the video, sent them to the temporal convolutional network after preprocessing, and predicted the completion of the operation; our work was accepted by IJCARS.
- Participated in the Endoscopic Vision Challenge of MICCAI, detected the surgical phase, recognized surgical motion, and identified the surgical instrument with I3D, ResNet, and GRU models; scored 4th, 7th, and 8th in three sub-items

COURSE PROJECTS

Course: Compiler Design, BUAA | *Developer*   October – December 2019
Project: C-like compiler with error handling and code optimization, https://github.com/dreamguo/Compiler_Design
Advisor: Chunming Hu, Professor at College of Computer Science, BUAA
- Generated a quaternion from a C-like grammar, then generated MIPS language and optimized the code
- Recognized syntax errors and semantic errors and implemented error localization
- Implemented code optimization, including code introversion, register allocation, and peephole optimization; ultimately increased speed by an order of magnitude and achieved the top 10% in optimized racing

Course: Data Structure, BUAA | *Developer*   January 2019
Project: Multi-function Search Engine Based on "Sina News", https://github.com/dreamguo/Multifunctional_search_engine
Advisor: Bo Li, Professor at College of Computer Science, BUAA
- Implemented PageRank-based and time-based sorting to generate news headlines, time, part of the body the crawler gets
- Implemented relevance (body word frequency, keyword, title weighted)-based sorting to generate news headlines, time, part of the body the crawler gets; generated hot search word map and hot search vocabulary list.
- Created a Tkinter interactive interface, including image display, word cloud image creation, single selector, partition display, user friendly, fool mode, scroll bar, background monitoring; achieved high scores (9/10)

HONORS AND AWARDS

- Outstanding Graduates at BUAA   2021
- The First Prize Scholarship on Academic Competition at BUAA (Top 5%)   2020, 2019
- The Special Prize Scholarship on Social Work at BUAA (Top 1%)   2019
- The Third-Class Innovation Scholarship at Ministry of Industry and Information Technology   2019
- The Second Prize in China Undergraduate Physics Tournament (Final)   2018
- The First Prize in China Undergraduate Physics Tournament (North China Division) (Top 10%)   2018

LEADERSHIP AND ACTIVITIES

- Student Union, Department of Volunteers | *President*   August 2018 - June 2019
- Student Committee of Institute, Psychological Development Counseling Committee   October 2017 - August 2018

SKILLS

Familiar with C, C++, Java, Python, and Linux operating environment; mastered MIPS, MATLAB, Arduino, Cuda

Familiar with PyTorch and OpenCV; hold multiplayer programming experience in GitHub and server

Office Applications: Microsoft Office, Ubuntu, Raspberry Pi

Languages: Chinese (Native), English (Fluent)