Qiushan Guo

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Education

The University Of Hong Kong, Hong Kong, China 2020.9 –
PhD student in Computer Science supervised by Prof. **Yizhou Yu** and Prof. **Ping Luo**

Beijing University Of Posts And Telecommunications, Beijing, China 2017 – 2020
Master student supervised by Prof. **Yuan Dong**

Beijing University Of Posts And Telecommunications, Beijing, China 2013 – 2017
B.S. in Information and Communication Engineering

Honors and Awards

National scholarship Top 1% 2018
First-class scholarship Top 10% 2019
First-class scholarship Top 10% 2018
First-class scholarship Top 10% 2017
Second class prize the NXP Cup National University Students Intelligent Car Race 2016
Top 1%, 3 out of 238 teams from all over the country.

Second class prize of Mathematical Contest In Modeling 2016
Third class prize of The Chinese Mathematics Competitions 2015
First class prize of The Chinese Physics Competitions 2014
First place in Signboard Detection Competition held by Baidu 2018

Publications

I have published 10 papers on the top AI conferences. 6 of them as the first author. Besides, 2 papers are under review as the first author.

1. RegionGPT: Towards Region Understanding Vision Language Model CVPR 2024
Qiushan Guo, Shalini De Mello, Hongxu Yin, Wonmin Byeon, Ka Chun Cheung, Yizhou Yu, Ping Luo, Sifei Liu

2. RAPHAEL: Text-to-Image Generation via Large Mixture of Diffusion Paths NIPS 2023
Base model of SenseMirage
Zeyue Xue, Guanglu Song, **Qiushan Guo**, Boxiao Liu, Zhuofan Zong, Yu Liu, Ping Luo

3. EGC: Image Generation and Classification via a Diffusion Energy-Based Model ICCV 2023
Qiushan Guo, Chuofan Ma, Yi Jiang, Zehuan Yuan, Yizhou Yu, Ping Luo

4. Rethinking Resolution in the Context of Efficient Video Recognition NIPS 2022
Chuofan Ma, **Qiushan Guo**, Yi Jiang, Zehuan Yuan, Ping Luo, Xiaojuan Qi

5. Scale-Equivalent Distillation for Semi-Supervised Object Detection CVPR 2022
Qiushan Guo, Yao Mu, Jianyu Chen, Tianqi Wang, Yizhou Yu, Ping Luo

6. Companion Guided Soft Margin for Face Recognition ECML PKDD 2020
Yingcheng Su, Yichao Wu, Zhenmao Li, **Qiushan Guo**, Ken Chen, Junjie Yan, Ding Liang, Xiaolin Hu

7. Online Knowledge Distillation via Collaborative Learning (Oral) CVPR 2020
Qiushan Guo, Xinjiang Wang, Yichao Wu, Zhipeng Yu, Ding Liang, Xiaolin Hu, Ping Luo

8. Dynamic Recursive Neural Network CVPR 2019
Qiushan Guo, Zhipeng Yu, Yichao Wu, Ding Liang, Haoyu Qin, Junjie Yan

9. MSFD:Multi-Scale Receptive Field Face Detector ICPR 2018
Qiushan Guo, Yuan Dong, Yu Guo, Hongliang Bai

10. DSDM:Diff-Scale and Dynamic-Margin Softmax loss for face recognition ICCC 2019
Jianwei Zhang, **Qiushan Guo**, Yuan Dong, Hongliang Bai

11. Rethinking the Noise Schedule of Diffusion-Based Generative Models Tech Report
Qiushan Guo, Sifei Liu, Yizhou Yu, Ping Luo

12. Multi-Level Contrastive Learning for Dense Prediction Task Submitted to ECCV 2024
Qiushan Guo, Yizhou Yu, Jiannan Wu, Yi Jiang, Zehuan Yuan, Ping Luo

Professional Service

Reviewer for Conference

- IEEE International Conference on Computer Vision (ICCV) 2021 – 2023
- Computer Vision and Pattern Recognition (CVPR) 2022 – 2024
- European Conference on Computer Vision (ECCV) 2022
- Conference on Neural Information Processing Systems (NeurIPS) 2022 – 2023
- International Conference on Machine Learning (ICML) 2023
- International Conference on Learning Representations (ICLR) 2024
- IEEE/CVF Winter Conference on Applications of Computer Vision (WACV) 2024

Reviewer for Journal

- IEEE Transactions on Neural Networks and Learning Systems 2020 – Now

Teaching Experience

Teach Assistant of HKU COMP 3270 (Artificial Intelligence) 2022.9 – 2022.12
Teach Assistant of HKU COMP 3270 (Artificial Intelligence) 2023.9 – 2023.12

Research Experience

Nvidia Research 2023.6 – Now
Intern Diffusion Model and multi-modal LLM.

ByteDance Beijing, China 2022.5 – 2023.1
Intern EGC: Image Generation and Classification via a Diffusion Energy-Based Model.

- Propose an unified architecture for image recognition and generation, namely EGC, which can achieve superior performance in both tasks using a single neural network.
- The network estimates the energy and classification probability given a noisy image in the forward propagation, while denoising it using the score function estimated in the backward propagation.

Intern Multi-Level Contrastive Learning for Dense Prediction Task.

- Propose an efficient self-supervised method for learning region-level feature representation for dense prediction tasks.
- Motivated by the three key factors in detection: localization, scale consistency and recognition, MCL assembles multi-scale images in a montage manner to mimic multi-object scenarios.
- MCL constructs a multi-level contrastive loss that considers each sub-region of the montage image as a singleton.

SenseTime Group Limited Beijing, China 2018.9 – 2019.11

SenseTime is an AI unicorn valued over 3 billion USD. It's the fifth China's National Open Innovation Platform for Next-Generation Artificial Intelligence.

Intern Dynamic Recursive Neural Network.

- Simplify the duplicated building blocks in deep neural network. Employ dynamic block recursively to reduce the computational cost and model size.
- Propose LVBN to stabilize the gradients of recursive networks and improve LVBN to deal with the statistical bias caused by different loop time.
- Our DRNN outperforms ResNet-101 while reducing 47.0% model size and 35.2% computational cost. Outperforms ResNeXt-50 by 1.2 mAP on detection and 0.9 mAP on instance segmentation.

Intern Knowledge Distillation via Collaborative Learning.

- Generate teacher logits by the optimal combination of students logits and induce all student networks to converge with less generalisation error.
- The collaborative learning of ResNet-50 and ResNet-18 on ImageNet can outperform the baseline by 1.0% and 1.9%.
- Collaborative learning saves training time, combine the knowledge of all student models and improves the performance of both large and small models.

Intern Network Architecture Search.

- Gradient-based search algorithm framework with Gumble-softmax straight-through estimation.
- Evolution algorithm for producing cell and multi-branch design.
- 74.0% Top-1 accuracy and 52.2ms latency on ImageNet val set.(MobileNetv2 72.0% and 52.7ms).

Intern Face Recognition.

- Automatically adapt margin hyperparameter of angle-based softmax loss.
- Set different scale for the inter-class and intra-class cosine similarity to provide stronger supervision.
- Our novel loss surpasses arcFace loss on MegeFace dataset by 1% when the size of distractor is 10^6.

Pattern Recognition&Intelligent System Laboratory 2016.9 – 2018.9

Part of the national engineering laboratory for information content security technology.
One of the key laboratories in the national "211" project.
The laboratory supported by "111" innovation base project of ministry of education.

Student Face Detector and Object Detector

- Propose a high-performance single shot face detector based on dense anchor assignment and cascade method.
- Propose a high-efficiency single shot face detector based on rapid digested block and data-anchor-sampling.
- My high-performance face detector achieves 95.6(Easy), 94.8(Medium,) 89.5(Hard) for WIDER FACE validation set while 99.3% recall ratio for FDDB(2k False positive samples).
- My high-efficiency face detector achieves 93.5% recall ratio for FDDB while run at 250 FPS on NVIDIA 1080Ti for images with 640×640 resolution. The model is accelerated by TensorRT and code is available on GitHub.
- Reimplements PyramidBox, a state-of-the-art face detector in ECCV 2018, with pytorch, the results on WIDER FACE val set is 95.3%, 94.3% and 89.0%.