

# HANZHE HU

Department of Machine Intelligence  
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## EDUCATION

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Peking University, MS in Computer Science, School of EECS	Sep. 2019 – Jul. 2022
Nanjing University, BS in Physics, School of Physics (Elite Program, Top 15%)	Sep. 2015 – Jul. 2019

## RESEARCH INTEREST

Computer Vision, Scene Understanding, Semantic Segmentation, 3D Vision, Representation Learning, Few-Shot Learning, Semi-Supervised Learning, Self-Supervised Learning, Imbalanced Learning, Machine Learning

## SCHOLARSHIPS & AWARDS

- 2021 Merit Student of Peking University (Top 1%)
- 2021 Award for Academic Innovation, Peking University (Top 1%)
- 2021 **Top 10 Outstanding Researcher**, Peking University (Highest honor in School of EECS, 0.1%)
- 2021 HUAWEI Scholarship, Peking University (Top 0.5%)
- 2020 Award for Outstanding Research, Peking University (Top 1%)
- 2019, 2020 and 2021 Peking University Scholarship
- 2016 Xingquan Zeren Scholarship, Nanjing University
- 2016, 2017 and 2018 Renmin Scholarship, Nanjing University

## PUBLICATIONS

1. **Hanzhe Hu**, Fangyun Wei, Han Hu, Qiwei Ye, Jinshi Cui and Liwei Wang. *Semi-Supervised Semantic Segmentation via Adaptive Equalization Learning*. Advances in Neural Information Processing Systems (**NeurIPS**) **2021 (Spotlight, 3%)**. [\[paper\]](#)
2. **Hanzhe Hu**, Jinshi Cui and Liwei Wang. *Region-aware Contrastive Learning for Semantic Segmentation*. IEEE International Conference on Computer Vision (**ICCV**) **2021**. [\[paper\]](#)
3. **Hanzhe Hu**, Shuai Bai, Aoxue Li, Jinshi Cui and Liwei Wang. *Dense Relation Distillation with Context-aware Aggregation for Few-shot Detection*. IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) **2021**. [\[paper\]](#)
4. Deyi Ji, Haoran Wang, **Hanzhe Hu**, Weihao Gan, Wei Wu and Junjie Yan. *Context-aware Graph Convolutional Network for Target Re-identification*. AAAI Conference on Artificial Intelligence (**AAAI**) **2021**. [\[paper\]](#)
5. **Hanzhe Hu**, Deyi Ji, Weihao Gan, Shuai Bai, Wei Wu and Junjie Yan. *Class-wise Dynamic Graph Convolution for Semantic Segmentation*. European Conference on Computer Vision (**ECCV**) **2020**. [\[paper\]](#)
6. **Hanzhe Hu**, Jinshi Cui and Hongbin Zha. *Boundary-aware Graph Convolution for Semantic Segmentation*. IEEE International Conference on Pattern Recognition (**ICPR**) **2020**. [\[paper\]](#)
7. Shuai Bai, Zhiquan He, Yu Qiao, **Hanzhe Hu**, Wei Wu and Junjie Yan. *Adaptive Dilated Network with Self Correction Supervision for Counting*. IEEE Conference on Computer Vision and Pattern Recognition (**CVPR**) **2020**. [\[paper\]](#)

## RESEARCH EXPERIENCE

### Microsoft Research Asia (MSRA)

Supervisor: Dr. Han Hu

P.R. China  
Mar, 2021 – May, 2021

### Research on Semi-Supervised Semantic Segmentation

- Proposed a novel framework for semi-supervised semantic segmentation, named adaptive equalization learning (AEL)
- Introduced two strategies to tilt training towards under-performing categories: 1) increasing the proportion of training samples from target categories; 2) tilting training towards target categories
- Outperformed the state-of-the-art methods by a large margin on the Cityscapes and PASCAL VOC benchmarks under various data partition protocols

**Peking University**

Supervisor: Prof. Liwei Wang &amp; Prof. Jinshi Cui

P.R. China

Jun, 2020 – Mar, 2021

**Research on Few-Shot Detection and Segmentation**

- Summarized the main challenges in few-shot detection problem: 1) incomplete exploit of support information; 2) scale variation problem
- Proposed a dense relation distillation module and a context-aware feature aggregation mechanism to tackle the main challenges in few-shot detection problem
- Achieved state-of-the-art performance on PASCAL VOC and COCO datasets
- Proposed the Meta-Seg framework for generalized few-shot segmentation problem
- Achieved state-of-the-art performance on N-way K-shot segmentation tasks on PASCAL-5<sup>i</sup> and COCO-20<sup>i</sup> benchmark datasets

**Research on Contrastive Learning for Semantic Segmentation**

- Proposed a new contrastive learning setting in the fully supervised manner for segmentation
- Designed an effective region-aware contrastive learning paradigm to explore semantic relations from the holistic view of the whole dataset
- Achieved state-of-the-art performance on three semantic segmentation benchmarks, including Cityscapes, ADE20K and COCO Stuff

**Nanjing University**

Advisor: Prof. Yang Yu

P.R. China

Dec 2017 – Mar 2018

**Research on Zeroth-order Optimization**

- Improved the python packages for zeroth-order optimization: ZOOpt and ZOOSrv (a distributed version of ZOOpt)
- Designed comparative experiments to compare the optimization efficiency with other methods including CMA-ES and BayesOpt on testing functions such as sphere and ackley functions

**PROFESSIONAL SKILLS**

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**Programming Language:** C/C++, Python**Deep Learning Framework:** Pytorch, Tensorflow**Computing Software:** Matlab, Mathematica, Origin**Language Skills:** TOEFL iBT (104/120), GRE (321/340, 4.0/6.0)