

# HAO ZHANG

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## EDUCATION

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**Chongqing University Of Posts And Telecommunications**

Bachelor

Department of Electronic Engineering

## RESEARCH INTERESTS

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Wireless Sensing and Wireless Security.

Computer Networking.

Machine Learning.

## EXPERIENCE

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**Learning and Vision Lab at National University of Singapore**

June 2019 - August 2019

*Research assistant advised by Prof. Jiashi Feng*

- Work on NeurIPS 2019: MineRL Competition and our team get 4th place.
- Project page (<https://policy.fit/project/minerl/>).
- Work on distributed reinforcement learning.
- Combine PPO with Vtrace (an off-policy correction method) to improve the performance of PPO in MineCraft. Vtrace can reduce the lag of policy used for generating data and policy used for updating data.
- Replicate the **Impala** in ray.

**Amazon AI**

March 2019 - June 2019

*Visiting Research Student*

- Help to build a deep learning system for graph neural network model with my **teammates**.
- Employed as a student volunteer of DGL team and profile DGL with GraphNet.
- Improve the performance of GCN and GAT.
- Propose a method that can sparsify the molecule dataset according to the edge attention, it not only keeps the performance in the molecule dataset, but also reduces the complexity of the operation. I also use the sparsified graph to retrain GraphSage, the performance is still good.
- In some graphs (like social network), the entropy of attention is not very sharp, I use Lasso to analyze which feature of graphs has a big influence on the distributions of attention.

**UW Networks and Mobile Systems Lab**

July 2020 - August 2021

*Visiting Research Student advised by Prof. Shyam Gollakota*

- Work on developing and deploying AR application on wearable devices like deploying face detection algorithm to VR headset and interact with eye tracking function in VR device.
- Explore multi-channel real-time speech separation and help to replicate state-of-the-art real-time speech separation baselines.
- Simulate synthetic audio dataset and help to validate Beamforming for speech separation with angle information.

- Work on using deep learning algorithm for simulating the defense and attacking process for IoT devices and using learning algorithm to detect exfiltration for IoT devices.
- Use deep neural networks for flow size prediction.
- Collect TCP packet dataset and use it to train a flow size predictor and deploy the flow size predictor in multi-path sockets for picking up a best-suited path to improve networking system performance.

## PUBLICATIONS (284 CITATIONS)

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Anran Wang, Maruchi Kim, **Hao Zhang**, Shyam Gollakota "Hybrid Neural Networks for On-device Directional Hearing" AAAI-2022

**Hao Zhang**, Giacomo Giuliani and Adrian Perrig "Data Exfiltration Detection: A Learning Game" Semester Project

Mufei Li, **Hao Zhang**, Xingjian Shi, Minjie Wang, Zheng Zhang "A Statistical Characterization Of Attentions In Graph Neural Networks" ICLR 2019( Representation Learning on Graphs and Manifolds Workshop) **3 citations**

Quanshi Zhang, Yingnian Wu, **Hao Zhang**, Songchun Zhu."Mining deep And-Or object structures via cost-sensitive question-answer-based active annotations" Computer Vision and Image Understanding

Minjie Wang , Lingfan Yu , Da Zheng , Quan Gan , Yu Gai , Zihao Ye, Mufei Li, Jinjing Zhou, Qi Huang, Chao Ma , Ziyue Huang, Qipeng Guo, **Hao Zhang** , Haibin Lin , Junbo Zhao , Jinyang Li , Alexander Smola , Zheng Zhang "Deep Graph Library: Towards Efficient and Scalable Deep Learning on Graphs" ICLR 2019(Representation Learning on Graphs and Manifolds Workshop) **281 citations**

Mufei Li, **Hao Zhang**, Xingjian Shi, Minjie Wang, Yixing Guan, Zheng Zhang. "Characterize and Transfer Attention in Graph Neural Networks" OpenReview

## OPENSOURCE PROJECTS

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**GluonCV**: GluonCV provides implementations of state-of-the-art (SOTA) deep learning algorithms in computer vision. It aims to help engineers, researchers, and students quickly prototype products, validate new ideas, and learn computer vision. I contribute to the model zoo of GluonCV. (**5000** stars in GitHub: <https://github.com/dmlc/gluon-cv>)

**DGL (Deep Graph Library)**: DGL is a Python package dedicated to deep learning on graphs, built atop existing tensor DL frameworks (e.g. Pytorch, MXNet) and simplifying the implementation of graph-based neural networks. (**8500** stars in GitHub, <https://www.dgl.ai/>)

**GCN-GraphNet**: I replicate GCN in GraphNet and SonNet. It's the first version of Graph Neural Network written in GraphNet. **12** stars in GitHub: [https://github.com/sufeidechabei/graphnets\\_gcn](https://github.com/sufeidechabei/graphnets_gcn)).

**CycleGAN-Gluon**: I replicate the CycleGAN in gluon, it can capture special characteristics of one image collection and figure out how these characteristics could be translated into the other image collection. **8** stars in GitHub: <https://github.com/sufeidechabei/Gluon-CycleGAN>

## TECHNICAL STRENGTHS

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**Computer Languages**  
**Software & Tools**

Python, C/C++, MATLAB  
Git, Latex, Mxnet, Pytorch, Ray, Tensorflow, Caffe