

# Anxiang (Adam) Zhang

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## PERSONAL STATEMENT

A dedicated and self-motivated student with research interest in natural language processing, knowledge mining and machine learning. I have built comprehensive knowledge of natural language processing and deep learning. I have proven abilities in problem solving and dream realizing. My dream is to automate and understand the knowledge distilling process using learning algorithm and data-driven method. Make real impact on the world!

## EDUCATION

**Carnegie Mellon University - School of Computer Science** Pittsburgh, PA

*Master of Information Technology, GPA: 3.6/4*

*Expected 2020.12*

**Relevant Coursework:** Introduction to Deep Learning(PhD Level), Introduction to Machine Learning (PhD Level), Machine Learning on Large Dataset, Introduction to Computer System, Parallel Computing Architecture, Devops, Distributed System

**Southwestern University of Finance and Economics** Chengdu, China

*Bachelor of Economics & Major in Finance, minor in Computer Science; GPA: 89/100*

*2015.09 - 2019.07*

**Relevant Coursework:** Data Structure, Algorithm Analysis, Operation Systems

- National Award (Top 1%) in China Undergraduate Mathematical Contest in Modeling (2017);

## SOFTWARE SKILLS

- **Programming & Software Skills:** Python, Pytorch, C/C++, CUDA, OpenMPI, OpenMP, Java, Spark
- **Technologies:** Linux, AWS, gRPC, Docker, Devops, Vagrant, Git

## PUBLICATIONS

- Yu Zhao\* and Anxiang Zhang\*, "Connecting Embeddings for Knowledge Graph Entity Typing", *Proceedings of the 58th Annual Meeting of the Association for Computational Linguistics*, 6419-6428, July 2020

## RESEARCH AND WORK EXPERIENCE

**School of Computer Science, Carnegie Mellon University** Pittsburgh, PA

*Graduate Teaching Assistant for Introduction to Deep Learning (Ph.D. Level) by Bhiksha Raj*

*2020.06 - Present*

- Preparing recitations for regularization in deep learning. Topics include Batchnorm, Dropout, initialization, L1/L2 and data augmentation.
- Mentoring Group Projects regarding Graph Neural Network, Music Generation and Super Resolution.

**Southwestern University of Finance and Economics**

Chengdu, China(Remote)

*Research Assistant*

*2019.04 - Present*

- **Graph Attention Network and Keyphrase Extraction:** Designing an Attention ranking algorithm to rank text phrases in a document. Combined Graph Attention Network and PageRank together to optimize the ranking performance.
- **Knowledge Graph Completion:** Built two distinct knowledge-driven models for entity type inference. Achieved SOTA performances in both Freebase and Yago KG datasets. Published [Connecting Embeddings for Knowledge Graph Entity Typing](#) as first co-author in 58-th Annual Meeting of the Association for Computational Linguistics(ACL).

**Hong Kong University of Science and Technology**

Hong Kong, China(Remote)

*Research Assistant*

*2020.02 - 2020.05*

- Designed a heuristic tree-based distributed Auto-ML training framework using Dask.distributed, a Python distributed framework.
- Implemented successive halving algorithm during hyper-parameter tuning to attain high parallelism; Results showed 5x speedup using two 4-core nodes and 94% prediction accuracy on KC1 dataset.

## Explainable-Games, sponsored by David Garlan

Pittsburgh

Software Engineer, Institute of Software Research, Carnegie Mellon University

2020.02 - 2020.08

- Lead the meeting and collected requirements details with clients; iterated with clients to improve usability and extensibility of the application.
- Developed a game theory web visualization application using D3.js and Python flask. It could help researchers to understand the security attacks.
- Employed gRPC, a high-performance RPC framework, to connect our application with clients' architecture visualizer; Leveraged protocol buffers to make the interface language-neutral, platform-neutral and extensible enough for connecting any third-party visualizer.

## COURSE PROJECTS

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### Speech Recognition Competition

2020.04 - 2020.06, Pittsburgh

- Built a character-level Listen, Attend and Spell model and used beam search to improve prediction performance.
- Implemented teacher-forcing, variational-dropout and weight tying tricks to overcome overfitting problem; ranked 14/245.

### Neural Network Pruning Competition

2020.04 - 2020.05, Pittsburgh

- Fine-tuned a simple 8-Layer CNN to get a 82% prediction rate after 50 epochs on CIFAR10 small dataset. Utilized individual weight pruning method to achieve 85% sparsity and 79% accuracy rate; Ranked 12/136.

### Fraud Detection Competition

2019.09 - 2020.01, Pittsburgh

- Applied LightGBM with hyper-parameter searching and feature engineering techniques to predict purchase fraud.
- Ensembled LightGBM, XGboost, Catboost to increase the performance; awarded with a Top 3% silver medal among 1800 participants.

### Dual-Track Music Generation Using LSTM

2019.05 - 2020.01, Pittsburgh

- Designed a novel (LSTM + MLP)-based dual-track architecture for generating classical piano music, which is able to model the inter-dependency of left-hand and right-hand piano music; evaluated different models and training tricks in Nottingham dataset.

### Parallel Computing Projects

2019.08 - 2020.01, Pittsburgh

- Built a renderer to draw colored circles having sequential dependency. Utilized exclusive-scan to leverage shared memory in CUDA blocks, achieving 10 times improvement compared to benchmark.
- Applied message passing model using OpenMPI, CUDA to parallelize streaming histogram-based decision tree building process; applied OpenMPI gather, scatter collective operation to do decentralized ring allreduce synchronization to achieve better bandwidth usage and load balancing.
- Bundled 4 binned features into a 4-feature tuple to leverage locality of GPU memory access;

### Stock Trend Prediction using Reddit Data

Apr. 2020 - June 2020, Pittsburgh

- Applied PCA and sentiment analysis to extract features from 1 TB Reddit comments using MapReduce. Created cluster on AWS EMR machine and used AWS S3 bucket to store the large data.
- Trained a logistic regression to predict the stock market trend using PySpark; obtained 65% prediction accuracy.