

JINJIE ZHANG

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SUMMARY

Dynamic and creative Ph.D. candidate with top academic performance in applied mathematics and statistics, having 5+ years of experience in developing machine learning and deep learning algorithms, writing production-level code for leading tech companies, submitting research papers to top AI and ML conferences.

EDUCATION

University of California, San Diego 09/2018-04/2023 (expected)

Ph.D. in Applied Mathematics. GPA 4.0

Advisors: Rayan Saab and Alexander Cloninger.

University of Chicago 09/2016-06/2018

M.S. in Statistics. GPA 3.9

Advisor: Lek-Heng Lim.

Beijing Jiaotong University (a.k.a. Northern Jiaotong University) 09/2012-06/2016

B.S. in Information and Computing Science. GPA 3.8

WORK EXPERIENCE

Applied Scientist Intern, Amazon, Bellevue, WA 06/2022-09/2022

Amazon Flex Science Team

- Used Python and SQL to manipulate data and perform statistical analysis on the engagement of Amazon delivery partners (DPs), i.e. drivers, where DPs were categorized into several cohorts according to their working time.
- Developed a Markov chain machine learning model to approximate the transition probabilities between different cohorts of DPs and used the proposed model to forecast labor capacity for each service region.
- Wrote a research paper with other applied scientists and the paper was accepted by AMLC 2022. Our Markov chain model was deployed to the product using Java and AWS Lambda.
- Performed feature importance analysis using XGBoost and LightGBM to identify features, e.g. price and warehouse, that can stimulate DP engagement and increase working time. Our A/B testing results verify that modifying these features can improve the DP working time by 15%, which significant reduces the cost of promotions and recruitment.

Applied Scientist Intern, Amazon, Bellevue, WA 06/2021-09/2021

Amazon Flex Science Team

- Designed a new ensemble learning method to improve the prediction accuracy of time series forecasting models (e.g. autoregression, ARIMA, exponential smoothing) in production, which predict daily package volume in Amazon warehouses.
- Our ensemble learning algorithm improved the prediction accuracy by 3% in average, saved 2 million dollars for Amazon per year, and outperformed other strong forecasting tools, including XGBoost, LightGBM, and DeepAR.
- Implemented SQL and Spark to extract, transform, and load large customer dataset from Amazon Redshift and managed Python packages of machine learning models via AWS Lambda and Amazon EC2.
- Explored and modified various deep learning models for time series forecasting based on RNNs, LSTM networks, GRUs, and Transformers (attention mechanism).

Research Intern, Lenovo, Chicago, IL 01/2021-05/2021

Deep Learning and Algorithm Group

- Worked with research scientists from Lenovo Research to propose and improve low-light image enhancement algorithms via deep generative models, including GANs, autoencoders, and retinex based approaches.
- Developed a real-time object detection and segmentation system based on YOLO, U-Net and (Fast/Mask) R-CNN.
- Launched EC2 instances and deep learning AMI with TensorFlow/PyTorch (GPU) on Amazon Web Services (AWS) to build up and train our deep learning models.
- Ran TensorFlow Lite benchmark tools on Android and iOS devices and deployed our models to the product: selfie camera in a mobile device.

Research Intern, Mitsubishi Electric Research Laboratories, Cambridge, MA 2020/09-2020/12

Research Project in Graph Signal Processing

- Focused on the generalization and stability analysis of graph scattering transforms (GSTs) that is competitive in a variety of graph classification tasks on protein data sets D&D and the scientific collaboration dataset Collab.
- Developed a novel approach to prune the graph scattering transform to remove non-informative features on-the-fly and evaluated its performance in classifying 3D point clouds using ModelNet40 dataset.

Graduate Student Researcher, UC San Diego, La Jolla, CA

2019/06-present

Machine Learning and Compressed Sensing Group

- Project 1: Used PyTorch to modify geometric deep learning (GDL) frameworks on graphs including DeepWalk, GraphSAGE, and NeoDTI, which leads to a state of the art algorithm in machine learning.
- Project 2: Unified active learning (AL) on graphs and graph convolutional networks (GCNs) to improve classification accuracy by 5% on citation network datasets: Cora, Citeseer, and Pubmed.
- Project 3: Proposed a new active learning algorithm used to select coreset for semi-supervised learning and proved its generalization bound to unseen data, which outperforms previous algorithms and baselines.
- Project 4: Designed a fast binary embedding algorithm for large scale image retrieval and tested its performance on Yelp and Flickr image datasets. The relevant research paper was accepted by ICLR 2021.
- Project 5: Explored and coded various quantization, pruning, and knowledge distillation algorithms to compress and speed up deep neural networks.

PUBLICATIONS

Review full publication list via Google Scholar: [profile link](#)

1. J. Zhang, Y. Zhou, R. Saab, Post-training Quantization for Neural Networks with Provable Guarantees. *arXiv preprint arXiv:2201.11113*, (2022).
2. J. Zhang, A. Cloninger, R. Saab, Sigma-Delta and Distributed Noise-Shaping Quantization Methods for Random Fourier Features. *arXiv preprint arXiv:2106.02614*, (2021).
3. J. Zhang, R. Saab, Faster Binary Embeddings for Preserving Euclidean Distances. *International Conference on Learning Representations (ICLR)*, (2021).
4. J. Zhang, L.-H. Lim, S. Friedland, Grothendieck Constant is Norm of Strassen Matrix Multiplication Tensor. *Numerische Mathematik*, **143**, 905-922 (2019).
5. S. Friedland, L.-H. Lim, J. Zhang, An elementary and unified proof of Grothendieck's inequality. *L'Enseignement mathématique*, **64**, 327-351 (2018).
6. J. Zhang, S. Zheng, On refined Hardy-Knopp type inequalities in Orlicz spaces and some related results. *Journal of Inequalities and Applications*, **169**, (2015).

SKILLS

1. 6 years experience in Python programming, data analysis and machine learning. Excellent in OpenCV, NumPy, SciPy, Pandas, Matplotlib, Scikit-learn and other scientific libraries.
2. 5 years experience in CV, NLP, and deep learning frameworks including PyTorch, TensorFlow 2 and Keras.
3. 5 years experience in Amazon Web Services (AWS) ecosystem, including EC2 (virtual machines), SageMaker (machine learning platform), S3 (data storage and preparation), Lambda (build, train, and deploy models), and CloudWatch (anomaly detection).
4. 5 years experience in PostgreSQL and big data framework Spark.