

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 09/2018-05/2023 (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 6.5%, 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 (Computer Vision), Lenovo, Chicago, IL 01/2021-05/2021

Deep Learning and Algorithm Group

- Worked on low-light image and video enhancement algorithms, including diffusion models, 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.
- Explored and coded various quantization, pruning, and knowledge distillation algorithms to compress and speed up the trained deep neural networks that was deployed to the product: selfie camera in a mobile device.
- 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.

Research Intern (Graph Computing), Mitsubishi Electric Research Laboratories, Cambridge, MA
2020/09-2020/12

Research Group on Graph Signal Processing

- Unified active learning (AL) and graph convolutional networks (GCNs) to improve classification accuracy by 5% on graph datasets: Cora, Citeseer, and Pubmed.
- Used PyTorch to modify graph convolutional networks (GCNs) and geometric deep learning (GDL) frameworks on graphs, including DeepWalk, GraphSAGE, and NeoDTI, which leads to a state of the art algorithm in machine learning.
- 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.

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. *Accepted by SIAM Journal on Mathematics of Data Science (SIMODS)*, (appear soon in 2023).
2. J. Zhang, J. Huang, Y. Yu, The Markov Chain Model for DP Engagement. *Amazon Machine Learning Conference (AMLC), Workshop on People-Centered Science*, (2022).
3. J. Zhang, R. Saab, Faster Binary Embeddings for Preserving Euclidean Distances. *International Conference on Learning Representations (ICLR)*, (2021).
4. J. Zhang, A. Cloninger, R. Saab, Sigma-Delta and Distributed Noise-Shaping Quantization Methods for Random Fourier Features. *arXiv preprint arXiv:2106.02614*, (2021).
5. J. Zhang, L.-H. Lim, S. Friedland, Grothendieck Constant is Norm of Strassen Matrix Multiplication Tensor. *Numerische Mathematik*, **143**, 905-922 (2019).
6. S. Friedland, L.-H. Lim, J. Zhang, An elementary and unified proof of Grothendieck's inequality. *L'Enseignement mathématique*, **64**, 327-351 (2018).
7. 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. 7 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, Hugging Face, and TensorFlow.
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.
5. Familiar with containerized deployment using Docker and Kubernetes.