Chen Tiejin

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Education Background

Arizona State University, *School of Computing and Augmented Intelligence* 08/2023-present

- Ph.D. in Computer Science

University of Michigan, *Department of Statistics* 09/2021-05/2023

- Master of Applied Statistics
- GPA: 3.98/4.00

Sichuan University, *Wu Yuzhang Honors College* 09/2016-07/2020

- Major: Statistics | Degree: Bachelor of Science
- GPA: 3.55/4.00, 86.59/100.00 | Ranking: 4/33
- Awards: Sichuan University Individual Scholarship for 2017-2018 and 2016-2017 academic years, Sichuan University Comprehensive Scholarship for 2018-2019 academic years.

Paper

Chen Hongxu, **Chen Tiejin**, Wang Hao, Tian Wei Prison term prediction of dangerous driving based on probabilistic graphical model. *Journal of Sichuan University （Natural Science Edition）*[J]

Tiejin Chen and Yicheng Tao. Learning sparsity and randomness for data-driven low rank approximation. arXiv preprint arXiv:2212.08186, 2022.

Scientific Research Projects

Dataset Condensation 03/2022-Present

Remote Research Intern, Pennsylvania State University *Ann Arbor, Michigan*

Supervised by Assistant Professor Jinghui Chen

- Research about Dataset Condensation which aims to creating a much less dataset than original one and network trained on this new dataset can have similar performance with network trained on original dataset;
- Explore method which aims to have state-of-the-art performance; Try to combine Dataset Condensation with continual learning method such as AGEM.
- Research about utilizing dataset condensation under federated learning

Studies on Key AI Technologies Supporting A High Quality and Highly Efficient Court Trial 03/2019-03/2021

Research Assistant, Sichuan University *Chengdu, China*

National Key R&D Program of China supervised by Research Professor Wang Hao

- Used Python to preprocessing labeled data with one-hot encoding;
- Built the probabilistic graphical model for different crime;
- Increased model performance with auto-encoder;
- Attended national seminar 2019 in June

Projects and Training Research

Learning Sparsity and Randomness for Data-driven Low Rank Approximation 09/2022-12/2022

Member *Ann Arbor, Michigan*

- Came up with one method that can learn a sparsity patterns for low rank approximation with sketch matrix; Came up with another method that can learn a Gaussian distribution of value in sketch matrix instead of fixed value by trick of reparameterization;
- Designed several experiments to show that our method can learn a better sparsity patterns than pervious methods and replacing fixed values with random distributions can increase the performance

Algorithm Competition: Adversarial Robustness of Deep Learning Based on ImageNet 08/2022-11/2022

Member *Ann Arbor, Michigan*

- Attended the algorithm competition sponsored by Pazhou Lab, Guangzhou, which aims to get high average accurate on

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ImageNet under different white box attacks such as AutoAttack with different radius of perturbation;

- Replaced ReLU in Wide-ResNet with a more smoothing activation function such as SiLU to make the loss landscape smoother which is beneficial to robustness of deep learning model;
- Added Non-local means denoising filters to ResNet, which can reduce the affect of perturbation from white box attacks;
- Adversarially trained several ResNet and EfficientNet under AutoAttack with different radius on ImageNet, and trained a ensemble model with all models and a pertain Swin Transformer to get a final model;
- Ranked 5th among all participants and won a prize about 6000 dollars

Image Extension Inspired by Image Inpainting 01/2022 -04/2022

Leader *Ann Arbor, Michigan*

- Course project of EECS545 Machine Learning. The target is to extend artworks with semantic information as well as good texture;
- Came up with several novel methods to transfer difficult image extension problem into image inpainting problem including training and inference method;
- Implemented part of method with some mature image inpainting models such as Partial Convolution and Gated Convolution.
- Utilized Learned Perceptual Image Patch Similarity(LPIPS) loss to improve the performance of models; Calculated Peak Signal-to-Noise Ratio(PSNR) and Structural Similarity Index Measure (SSIM) to evaluate the performance of different method we implemented;

Machine Learning 09/2019-01/2020

Leader *Chengdu, Sichuan*

- Put forward a novel One vs, One (OvO) strategy to solve the problem of even ticket;
- Came up with a graph structure to visualize κ statistics and base classifiers so that people can find which base classifier don't have diversity with other classifiers easily;
- Came up with two different ways to combine accuracy with κ statistics used in measuring the diversity of base classifiers and its corresponding visualization method;
- Utilized Python to realize unbalanced data algorithms such as SMOTE and Random Down Sampling;
- Discussed with team member, and Utilized Python to preprocessing data including feature engineering and data cleaning

Internships

Points Technology 03/2021-08/2021

Algorithm intern *Shanghai, China*

- Get to learn federated learning. Reproduce the vertical logistic regression in federated learning way by numpy. Learn some basic knowledge of homomorphic encryption and secret sharing;
- Research about the recommendation system. Reproduce the SVD,FM,FunkSVD,BiasSVD algorithm with numpy, reproduce AutoRec. Denoisy AutoRec,NFM,AFM,AFN,NFM,FiBiNet,DeepFm etc. deep learning recommendation algorithm by Pytorch;
- Design a vertical DeepFm algorithm. Work with team to realize the vertical DeepFm

Skills & Hobbies

- **Computer Skills:** Python, Basic CPP, R,
- **Extracurricular Activities:** Deputy director of Reasoning Association for organizing decryption games, and organizing Sichuan University to join in the national BBS reasoning contest
- **Hobbies:** detective fictions, movies,