Tianyi Ma

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RESEARCH INTEREST

Machine Learning; Natural Language Processing; Data Mining, especially Graph Data Mining

EDUCATION

Southeast University **Nanjing, China**

B.S., Artificial Intelligence, 88.33/100 Aug.2019-Jun.2023

University of California, Los Angeles **Los Angeles, US**

Exchange, Data Science, 97/100 Mar.2022-May.2022

RELEVANT COURSEWORK

Machine Learning(R)	Machine Learning	Optimization Method
Natural Language Processing	Knowledge Engineering	Comprehensive Course Design of AI Algorithm
Linear Algebra	Complex Variable Functions	Probability Statistics & Stochastic Processes

PUBLICATION

Chen, Yueyao, Beilun Wang, **Tianyi Ma**, and Cheng Chen. "Applying Robust Gradient Difference Compression to Federated Learning." In *2023 26th International Conference on Computer Supported Cooperative Work in Design **(CSCWD)***, pp. 1748-1753. IEEE, 2023.

Wang, Beilun, **Tianyi Ma**, Zhengxuan Lu, and Haoqing Xu. "An End-to-End Mutually Interactive Emotion–Cause Pair Extractor via Soft Sharing." *Applied Sciences* 12, no. 18 (2022): 8998. (The first author is the advisor.)

Tan, Xiao, **Tianyi Ma**, and Tongtong Su. "Fast and Privacy-Preserving Federated Joint Estimator of Multi-sUGMs." *IEEE Access* 9 (2021): 104079-104092.

RESEARCH EXPERIENCE

Mutually interactive Emotion–Cause Pair Extractor via soft sharing May.2022-Jun.2023

- Proposed an end-to-end soft-shared Emotion–Cause Pair Extractor framework and extends the framework to be compatible with language models. The performance is improved by 8.64% with essentially the same number of parameters; a level close to that of the SOTA method is achieved with 11.5% of the number of trained parameters.
- Organized the derivation of formulas, wrote the entire paper, revised it and added experiments after submission.
- Extended the framework from Bi-LSTM to **BERT** with experimental validation.

Robust Spiking Neural Networks framework under noise and adversarial attacks April.2022-Feb.2023

- Designed an inherently robust model with channel-wise activation rcalibration to overcome the performance flaws of Spiking Neural Networks by establishing inter-neuron connections and refining the diverse activation without additional training. Provide insights into the interpretability of attacks.
- Achieved SOTA performance on MNIST with 99.52% accuracy and successfully defeats 6 SOTA attacks on standard benchmarks, ranging from a single attack to multiple attacks.
- Explored the comparison of DNNs and SNNs, built the framework of CARE, and plotted the experimental results

Graph attention network for recommendation system May.2022-Dec.2022

- Proposed a novel recommendation model for Knowledge-enhanced Tag-aware Recommendation System (KTRS), which firstly constructs a collaborative recommendation graph and then learns heterogeneous representation via an multi-layer multi-head attention mechanism.
- Conducted real-world experiments on two public datasets, the method performs great improvement over SOTA methods in top-K recommendation task.
- Investigated the comparison of TRS and KTRS in movie recommendation, and was responsible for the construction and drawing of the framework diagrams

Brain research based on deep learning interpretability Oct.2021-May.2022

- Simulated the intra-brain features of monkeys during playing Pac-Man by deep learning model, and predicted monkeys' decisions using ConvRNN. Predictive accuracy of monkey decision-making under three Pac-Man behaviors improved by 4% compared to previous methods combined.
- Gave an interpretable analysis of deep neural networks by generating the monkey's attention through Grad-CAM.

Time series data operation and maintenance analysis Jun.2021-Oct.2021

- Designed the anomaly detection algorithm: using Fast Fourier Transform to compute spectral residuals against the anomalous data, and constructing a discriminator for spectral residual thresholds end-to-end for anomaly detection.
- Compared with the baseline method, it improves 36.1% and 68.8%on KPI and Yahoo datasets, respectively.
- Won Grand Prize of the 17th "Challenge Cup" National Extracurricular Academic and Technological Works Competition for College Students (**Top 5** in China).

TECHNICAL SKILL

Programming: Python, R, C++, C, JavaScript
ML & NLP: PyTorch, TensorFlow, Scikit-Learn, Nilearn, Transformers
Tools: Linux, Git, Shell Script, LaTeX, Docker, Prisma, Caddy

AWARD

National Scholarship Oct.2022
Top 1%, highest scholarship from Ministry of Education of China

Outstanding Student Cadre Oct.2021, Oct.2022
Top 1%, Southeast University

Principle's Scholarship Oct.2021
Top 2%, Southeast University

Lenovo Research Institute Scholarship Apr.2021
Top 2%, Southeast University

Merit Student Dec.2020
Top 5%, Southeast University

UNIVERSITY AND COMMUNITY SERVICE

Class President Aug.2019-Jun.2023
School of Artificial Intelligence, Southeast University

Cloud Network Engineer Aug.2022
Information Technology Department, Huatai Securities Co., Ltd.

Teaching Assistant for Machine Learning Classes Feb.2022-Jun.2022
School of Artificial Intelligence, Southeast University

Freshman Class Instructor Jul.2021-Jun.2022
School of Computer Engineering, Southeast University

Outstanding Volunteers of Orientation Volunteer Service Sep.2020
Southeast University

President of Volleyball Association Jul.2020-Jul.2021
Southeast University