

Zhong Zhang 张众

UNIVERSITY OF ELECTRONIC SCIENCE AND TECHNOLOGY OF CHINA

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Education

University of Electronic Science and Technology of China

PH.D. CANDIDATE IN COMPUTER SCIENCE. SUPERVISOR: JUNMING SHAO

Chengdu, China

Sept. 2018 - Present

University of Electronic Science and Technology of China

M.ENG. IN COMPUTER SCIENCE. SUPERVISOR: JUNMING SHAO

Chengdu, China

Sept. 2016 - June 2018

University of Electronic Science and Technology of China

B.ENG. IN COMPUTER SCIENCE

Chengdu, China

Sept. 2012 - June 2016

Research Interests

Natural Language Processing

Language Modeling, Word Embedding, Natural Language Generation

Machine Learning

Low-rank Representation, Matrix Factorization, Subspace Clustering

Data Mining

Healthcare Data Mining, Graph Mining

Research Projects

Low-rank Bottleneck in Multi-head Attention Models

D.M. Lab, UESTC, China

LEAD RESEARCHER

May 2020 - Sept. 2020

- Analyzed the low-rank bottleneck problem in multi-head attention models, which degrades the expressiveness of the model when the hidden dimension is smaller than the input sequence length.
- Developed a simple yet effective method called Mixhead to solve the low-rank bottleneck issue in multi-head attention models.
- Improved multi-head attention models' performance on various tasks including language modeling, text classification, natural language inference and reading comprehension.

Representation Degeneration Problem in Language Modeling

D.M. Lab, UESTC, China

LEAD RESEARCHER

Sept. 2019 - Feb. 2020

- Theoretically analyzed the representation degeneration problem in language modeling and revisited the limitations of the previously proposed Cosine Regularization solution.
- Proposed an alternative Laplacian Regularization to ease the degeneration problem that overcomes the previous limitations.
- Improved the language modeling performance comparing with the baselines.

Chinese Word Embedding with Fusion of Local and Global Semantic Context

D.M. Lab, UESTC, China

CO-RESEARCHER

Sept. 2019 - Feb. 2020

- Developed a semantic graph enhanced Chinese word embedding method for better capturing both local and global semantic context.
- Improved the Chinese word embedding and achieved promising results on word similarity and analogy tasks over various benchmarks.

Medical Report Generation for Chest X-ray Scans

D.M. Lab, UESTC, China

CO-RESEARCHER & COLLABORATIVE RESEARCH WITH PROF. LEITING CHEN'S LAB

Nov. 2018 - June 2019

- Enhanced the capability of deep neural network for distinguishing and describing (ab)normal appearance of Chest X-ray images.
- Developed an automatic framework for generating human-like medical imaging reports using precise and coherent natural language.

Research on Low-rank Representation and Subspace Learning

D.M. Lab, UESTC, China

LEAD RESEARCHER

May 2017 - Sept. 2018

- Improved the joint matrix factorization performance under the multi-view setting by explicitly disentangling the latent topics.
- Developed a mutual-enhanced community detection and link prediction algorithm via cluster-driven regularization and low-rank matrix completion.
- Developed a novel subspace clustering algorithm that is able to identify arbitrarily oriented subspace clusters in massive noise.
*The paper won the **Best Paper Award** of DASFAA 2019.*

Data-driven Methods for Mental Illness Classification and Identification of Biomarkers

D.M. Lab, UESTC, China

RESEARCH ASSISTANT & COLLABORATIVE RESEARCH WITH WEST CHINA HOSPITAL OF SICHUAN UNIVERSITY

Dec. 2016 - Apr. 2017

- Researched classification algorithms to improve the diagnosis accuracy of mental illness.
- Implemented a prototype that doctor analysts can efficiently have clinic diagnosis and analyze potential biomarkers.

Publications

1. **Zhong Zhang**, Chongming Gao, Cong Xu, Rui Miao, Qinli Yang, Junming Shao. **Revisiting Representation Degeneration Problem in Language Modeling**. *Findings of the Association for Computational Linguistics: EMNLP 2020*, 2020.
 2. Chongming Gao, **Zhong Zhang**, Chen Huang, Hongzhi Yin, Qinli Yang, Junming Shao. **Semantic Trajectory Representation and Retrieval via Hierarchical Embedding**. *Information Sciences*, 2020.
 3. Zhongjing Yu, **Zhong Zhang**, Haoran Chen, Junming Shao. **Structured Subspace Embedding on Attributed Networks**. *Information Sciences*, 2020.
 4. Junming Shao, **Zhong Zhang**, Zhongjing Yu, Jun Wang, Yi Zhao, Qinli Yang. **Community Detection and Link Prediction via Cluster-driven Low-rank Matrix Completion**. In *Proceedings of the Twenty-Eighth International Joint Conference on Artificial Intelligence (IJCAI)*, 2019.
 5. **Zhong Zhang**, Chongming Gao, Chongzhi Liu, Qinli Yang, Junming Shao. **Towards Robust Arbitrarily Oriented Subspace Clustering**. *Database Systems for Advanced Applications (DASFAA)*, 2019. [**Best Paper Award**]
 6. **Zhong Zhang**, Didi Kang, Chongming Gao, Junming Shao. **SemiSync: Semi-supervised Clustering by Synchronization**. *Database Systems for Advanced Applications (DASFAA)*, 2019.
 7. Chongming Gao, shuai yuan, **Zhong Zhang**, Hongzhi Yin, Junming Shao. **BLOMA: Explain Collaborative Filtering via Boosted Local Rank-One Matrix Approximation**. *Database Systems for Advanced Applications (DASFAA)*, 2019.
 8. Liang, Sugai, Qiang Wang, Xiangzhen Kong, Wei Deng, Xiao Yang, Xiaojing Li, **Zhong Zhang**, et al. **White Matter Abnormalities in Major Depression Biotypes Identified by Diffusion Tensor Imaging**. *Neuroscience Bulletin*, 2019.
 9. **Zhong Zhang**, Zhili Qin, Peiyan Li, Qinli Yang, Junming Shao. **Multi-view Discriminative Learning via Joint Non-negative Matrix Factorization**. *Database Systems for Advanced Applications (DASFAA)*, 2018.
 10. Junming Shao, Qinli Yang, **Zhong Zhang**, Jinhu Liu, Stefan Kramer. **Graph Clustering with Local Density-Cut**. *Database Systems for Advanced Applications (DASFAA)*, 2018.
 11. Sugai Liang, Yinfei Li, **Zhong Zhang**, et al. **Classification of First-Episode Schizophrenia Using Multimodal Brain Features: A Combined Structural and Diffusion Imaging Study**. *Schizophrenia Bulletin*, 2018.
 12. Xiuli Song, **Zhong Zhang**, Rui Zhang, Miye Wang, Tao Li, Junming Shao, Xiaohong Ma. **Predictive Markers of Depression in Hypertension**. *Medicine*, 2018.
- * **Zhong Zhang**, Nian Shao, Chongming Gao, Rui Miao, Qinli Yang, Junming Shao. **Mixhead: Breaking The Low-Rank Bottleneck in Multi-Head Attention Models**. *Under Review*.

Teaching Assistant

2020	Big Data Analysis and Mining (For Postgraduate Students)	UESTC, China
2019	Data Mining and Big Data Analysis (For Undergraduate Students)	UESTC, China
2017	Big Data Analysis and Mining (For Postgraduate Students)	UESTC, China
2016	Probability and Statistics (For Undergraduate Students, EN)	UESTC, China

Honors & Awards

2019	Best Paper Award • DASFAA 2019	Chiang Mai, Thailand
2018	The First Prize Scholarship for Ph.D. Student	UESTC, China
2016	The First Prize Scholarship for Master Student	UESTC, China
2016	Recommended Postgraduate Candidate (Top 13%)	UESTC, China
2016	Outstanding Undergraduate Thesis Award	UESTC, China

Skills

Programming	Python, Matlab, \LaTeX , Java, C/C++, C#, Objective-C, Swift, HTML
Tools	Pytorch, Linux, Git, NLTK, AllenNLP, Fairseq, CoreNLP, Jieba, Weka, scikit-learn, Pandas, NetworkX
Languages	Chinese, English