Zhenyun **Deng**

Natural Language Processing

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Summary

I finished my PhD thesis from School of Computer Science, University of Auckland in September 2022. I have been fortunate to be advised by Prof. Michael Witbrock and Dr. Patricia Riddle. I am currently a research assistant in Strong AI Lab. Before that, I received M.S. from Guangxi Normal University, advised by Prof. Shichao Zhang and Prof. Xiaofeng Zhu.

My research interests lie in the area of Deep Learning, Interpretable AI, Natural Language Reasoning, Question Answering, Graph Neural Network, and Natural language generation. My PhD research project aims to build an interpretable multi-hop question answering system that can answer complex natural language questions and provide interpretable reasoning processes.

Education

The University of Auckland — *Auckland, New Zealand*

PhD student in Computer Science — *Aug. 2019 - Sept. 2022*

- Topic: Interpretable Multi-hop Question Answering

Massey University — *Auckland, New Zealand*

PhD student in Computer Science — *Oct. 2018 - Jul. 2019*

- Topic: Deep Learning for Structural Relation Extraction

Guangxi Normal University — *Guilin, China*

Master in Computer Science — *Sept. 2013 - Jun. 2016*

- Topic: Sparse Sample Self-representation for Subspace Clustering

Jiangxi Normal University — *Nanchang, China*

Bachelor in Computer Science — *Sept. 2009 - Jun. 2013*

Selected Publications

- **Zhenyun Deng**, Yonghua Zhu, Yang Chen, Qianqian Qi, Michael Witbrock, Patricia Riddle. Prompt-based Conservation Learning for Multi-hop Question Answering, International Conference on Computational Linguistics (COLING, **Core A**), 2022.
- **Zhenyun Deng**, Yonghua Zhu, Yang Chen, Michael Witbrock, Patricia Riddle. Interpretable AMR-Based Question Decomposition for Multi-hop Question Answering. International Joint Conference on Artificial Intelligence (IJCAI, **Core A***), 2022. (**Oral, 4%**)
- Rongyao Hu, **Zhenyun Deng**, Xiaofeng Zhu. Multi-scale Graph Fusion for Co-saliency Detection. AAAI Conference on Artificial Intelligence (AAAI, **Core A***), 2021. (**Co-first author)**
- **Zhenyun Deng**, Xiaoshu Zhu, Debo Cheng, Ming Zong, Shichao Zhang. Efficient kNN classification algorithm for big data. Neurocomputing, 2016. (**ESI Highly Cited Paper, citations: 464**)
- **Zhenyun Deng**, Yonghua Zhu, Qianqian Qi, Michael Witbrock, Patricia Riddle. Explicit Graph Reasoning Fusing Knowledge and Contextual Information for Multi-hop Question Answering. Deep Learning on Graphs for Natural Language Processing (DLG4NLP), 2022.(**Oral**)
- **Zhenyun Deng**, Shichao Zhang, Lifeng Yang, Ming Zong, Debo Cheng. Sparse sample self-representation for subspace clustering. Neural Computing and Applications, 2018.
- Qianqian Qi, **Zhenyun Deng**, Yonghua Zhu, Lia Jisoo Lee, Michael Witbrock, Jiamou Liu. TaKG: A New Dataset for Paragraph-level Table-to-Text Generation Enhanced with Knowledge Graphs, AACL-IJCNLP, 2022.
- Xiaojing Du, Qingfeng Chen, Debo Cheng, Qian Huang, Junyue Cao, **Zhenyun Deng**, Shichao Zhang. Stable Causal Feature Selection Based on Direct Causal Effect Estimation, IEEE HPCC, 2022. (Accepted)
- Qiming Bao, Alex Yuxuan Peng, Tim Hartill, Neset Tan, **Zhenyun Deng**, Michael Witbrock, Jiamou Liu. Multi-Step Deductive Reasoning Over Natural Language: An Empirical Study on Out-of-Distribution Generalisation. IJCLR-NeSy, 2022.
- Shichao Zhang, Debo Cheng, Rongyao Hu, **Zhenyun Deng**. Supervised feature selection algorithm via discriminative ridge regression. World Wide Web, 2018.
- Shichao Zhang, Yonggang Li, Debo Cheng, **Zhenyun Deng**, Lifeng Yang. Efficient subspace clustering based on self-representation and grouping effect. Neural Computing and Applications, 2018.
- Shichao Zhang, Lifeng Yang, **Zhenyun Deng**, Debo Cheng, Yonggang Li. Leverage triple relational structures via low-rank feature reduction for multi-output regression. Multimedia Tools and Applications, 2017.
- Shichao Zhang, Yonggang Li, Debo Cheng, **Zhenyun Deng**. Hypergraph Spectral Clustering via Sample Self-Representation. Fuzzy Systems and Data Mining, 2016.
- Debo Cheng, Shichao Zhang, **Zhenyun Deng**, Yonghua Zhu, Ming Zong. kNN Algorithm with Data-Driven k Value. International Conference on Advanced Data Mining and Applications, 2014. (**Best Paper Award**)
- Jun Yan, Debo Cheng, Ming Zong, **Zhenyun Deng**. Improved spectral clustering algorithm based on similarity measure. International Conference on Advanced Data Mining and Applications, 2014.

Experiences

Strong AI Lab, The University of Auckland — *Auckland, New Zealand*

Research Assistant (New Zealand Tertiary Education Commission fund) — *Aug. 2022 - Jan. 2023*

Tongfang Knowledge Network Technology Co., Ltd. (CNKI) — *Beijing, China*

Natural Language Processing Engineer — *Sept. 2016 - Sept. 2018*

- Implemented a system for evaluating the novelty of papers on CNKI dataset.
- Developed a summarization system for extracting contributions from papers.
- Improved the performance of paper recommendations using Deep Learning.

Project & Patent

- Research on the Open issue of Nearest Neighbor: Sponsored by Innovation Project of Guangxi Graduate Education, Project No. YCSZ 2015095, co-PI, May 2015-June 2016. (Master Project)
- Yonghua Zhu, Ming Zong, Debo Cheng, **Zhenyun Deng**, Ke Sun, Xiaofeng Zhu and Shichao Zhang. Embedded type attribute selection method based on subspace learning and application: Application No. CN104200077A, 2014. (China Patent)
- Shichao Zhang, Lifeng Yang, **Zhenyun Deng**, Debo Cheng. Subspace clustering algorithm system based on sparse sample self-representation: Registration Mark. 2016SR209623. (Software Copyrights)

Academic Services

Conference IJCAI 2022/2021; AAAI 2023/2021; ACMMM 2022/2021, CIKM 2022; ACL Rolling Review.

Journal Neurocomputing; Multimedia Tools and Applications; Neural Computing and Applications.

Teaching

CS351/SE351/CS751 (Fundamentals of Database Systems) — *Auckland, New Zealand*

Graduate Teaching Assistant — *Semester 1, 2020/2022*

Skills

Research Deep Learning, Interpretable AI, NLP, Question Answering, Natural Language Reasoning, Graph Neural Networks.

Programming Python, Matlab, C/C++

Languages English, Chinese

Software pytorch, tensorflow, scikit-learn

Honors & Awards

2022 **Awardee**, PhD Thesis Writing Award — *New Zealand*

2022 **Awardee**, Computer Science Graduate Student Travel Fund — *New Zealand*

2022 **Awardee**, New Zealand Tertiary Education Commission Fund — *New Zealand*

2018 **Awardee**, PhD Research Project Scholarship — *China*

2016 **Honor**, Excellent Post-graduate — *China*

2015 **Awardee**, China National Scholarship — *China*

2013 **Awardee**, Graduate Student Full Scholarship — *China*