YUTING NING

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RESEARCH INTERESTS

Natural Language Processing; Data Mining; NLP for Intelligent Education

EDUCATION

University of Science and Technology of China 09/2021 - 06/2024 (expected)
M.S. in Computer Science and Technology
Advisor: Enhong Chen
GPA: 4.11 / 4.3 (Ranking: 1/116)

University of Science and Technology of China 09/ 2017 - 06/2021
B.S. in Computer Science and Technology
GPA: 3.93 / 4.3 (Ranking: 5/253)

RESEARCH EXPERIENCE

University of Southern California 07/2023 - Present
Visiting Student, INK Lab, Advisor: Xiang Ren Los Angeles, CA

- **Project:** Long-Tail Knowledge Generation
  - Developed a logic-induced knowledge search framework for systematically generating long-tail knowledge statements as challenging evaluation data for LLMs.
  - Constructed a dataset with 50K knowledge statements using the framework.
  - Evaluated the generation and reasoning abilities of LLMs on the long-tail distribution.

University of Science and Technology of China 09/2021 - Present
Graduate Research Assistant, BDAA-BASE Group, Advisor: Enhong Chen Hefei, China

- **Project:** Natural Language Processing in Intelligent Education
  - Improved model comprehension and reasoning of educational resources, especially math problems.
  - Designed a contrastive pre-training method for holistically understanding mathematical questions.
  - Proposed a prompt-guided auto-formulation framework for optimization problems.
- **Project:** Evaluation of Large Language Models
  - Inspired by psychometrics, introduced an adaptive testing framework to effectively evaluate LLMs, which dynamically selects the following test questions based on the current model performance.
  - Conducted fine-grained diagnostics of LLMs from three aspects of human-level abilities.

Microsoft Research Asia 07/2020 - 12/2020
Research Intern, Social Computing Group, Mentor: Fangzhao Wu and Xing Xie Beijing, China

- **Project:** News Understanding and Recommendation
  - Developed multilingual news recommendation models for MSN online services.
  - Improved the news encoder with multi-view learning and the user encoder with multi-platform behaviors.

University of Science and Technology of China 03/2020 - 07/2020
Undergraduate Research Assistant, Advisor: Qi Liu Hefei, China

- **Project:** Federated User Modeling
  - Developed a hierarchical personalized federated user modeling framework, which considers the statistical heterogeneity, privacy heterogeneity and model heterogeneity of inconsistent clients.

PREPRINTS

1. **Yuting Ning**, Jiayu Liu, Longhu Qin, Tong Xiao, Shangzi Xue, Zhenya Huang, Qi Liu, Enhong Chen, Jinze Wu. A Novel Approach for Auto-Formulation of Optimization Problems. *arXiv preprint*, 2023. [PDF] [Code]

2. Huihan Li, **Yuting Ning**, Zeyi Liao, Siyuan Wang, Xiang Lorraine Li, Ximing Lu, Faeze Brahman, Wenting Zhao, Yejin Choi, Xiang Ren. In Search of the Long-Tail: Systematic Generation of Long-Tail Knowledge via Logical Rule Guided Search. *Submitted to ICLR2024*, 2023. [PDF] [Code] [Dataset]

3. Yan Zhuang, Qi Liu, **Yuting Ning**, Weizhe Huang, Rui Lv, Zhenya Huang, Guanhao Zhao, Zheng Zhang, Qingyang Mao, Shijin Wang, Enhong Chen. Efficiently Measuring the Cognitive Ability of LLMs: An Adaptive Testing Perspective. *Submitted to ICLR2024*, 2023. [PDF]

PUBLICATIONS

1. **Yuting Ning**, Zhenya Huang, Enhong Chen, Shiwei Tong, Zheng Gong, Shijin Wang. Towards a Holistic Understanding of Mathematical Questions with Contrastive Pre-training. *The 37th AAAI Conference on Artificial Intelligence (AAAI)*, 2023. [PDF] [Code]

2. Qi Liu, Jinze Wu, Hao Wang, Zhenya Huang, **Yuting Ning**, Ming Chen, Enhong Chen. Federated User Modeling from Hierarchical Information. *ACM Transactions on Information Systems (TOIS)*, 2023. [PDF]

3. Zheng Gong, Guifeng Wang, Ying Sun, Qi Liu, **Yuting Ning**, Hui Xiong, Jingyu Peng. Beyond Homophily: Robust Graph Anomaly Detection via Neural Sparsification. *32nd International Joint Conference on Artificial Intelligence (IJCAI2023)*, 2023. [PDF]

4. Ye Liu, Han Wu, Zhenya Huang, Hao Wang, **Yuting Ning**, Jianhui Ma, Qi Liu, Enhong Chen. TechPat: Technical Phrase Extraction for Patent Mining. *ACM Transactions on Knowledge Discovery from Data (TKDE)*, 2023. [PDF]

5. Jinze Wu, Qi Liu, Zhenya Huang, **Yuting Ning**, Hao Wang, Enhong Chen, Jinfeng Yi and Bowen Zhou. Hierarchical Personalized Federated Learning for User Modeling. *The 30th International World Wide Web Conference (WWW)*, 2021. [PDF]

6. **Yuting Ning**, Ye Liu, Zhenya Huang, Haoyang Bi, Qi Liu, Enhong Chen, Dan Zhang. Stable and Diverse: A Unified Approach for Computerized Adaptive Testing. *2021 IEEE 7th International Conference on Cloud Computing and Intelligent Systems (CCIS)*, 2021. [PDF]

PROJECTS

EduNLP [Code] [Doc] 09/2021 - Present

- Led the team to develop an unified oepn-source NLP library for multi-model educational resources.
- Implemented several educational question representation models and pre-training methods.
- Built the ModelHub to effectively manage the pre-trained models.

Intelligent Education Knowledge Graph (LUNA) [Web] 02/2021 - 07/2023

- Provided automatic analysis of educational resources and related intelligent education services.
- Developed the question search service and empowered question-based services with pre-trained LMs.

TEACHING EXPERIENCE

Machine Learning and Knowledge Discovery 09/2022 - 02/2023
Teaching Assistant, University of Science and Technology of China

AWARDS

First Prize Academic Scholarship, University of Science and Technology of China 2021, 2022, 2023
3rd place in NeurIPS Competition: Natural Language for Optimization (Subtask 2) [Web] 2022
Silver Prize (top 5%) in Kaggle Competition: Feedback Prize - Evaluating Student Writing [Web] 2022
Top 5% Outstanding Graduates of USTC, University of Science and Technology of China 2021
2rd place in MOOCCube Competition: Predicting Student Performances 2021
Baosteel Outstanding Student Scholarship (1/1800+ in USTC), Baosteel Education Fund 2020
National Scholarship, Ministry of Education of the People's Republic of China 2019