

## About me

I am a Ph.D. candidate in Education Technology at the Central China Normal University (CCNU) Faculty of Artificial Intelligence in Education(FOAIE). My research interests include Intelligent Tutoring Systems, Technology Enhanced Learning, and Automated Problem Solver. I follow the automated solver group, which focuses on Intelligent Education and Intelligent Research.



## Hao Meng Personal Statement



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## Research experiences

- since 2019 Ph.D. candidate in Education Technology CCNU  
In 2019, I enrolled in the Faculty of Artificial Intelligence in Education at Central China Normal University to pursue a Ph.D. in Education Technology. Since then, I have authored a total of 8 papers, comprising 1 SCI-indexed journal and 7 EI conference papers.  
  
I have worked under the supervision of Prof.Xinguo Yu, and I worked on A qualia role-based entity-dependency graph (EDG) proposed to represent and extract quantity relations for solving algebra story problems stated in Chinese. Traditional neural solvers use end-to-end models to translate problem texts into math expressions, which lack quantity relation acquisition in sophisticated scenarios. The proposed method leverages EDG to represent quantity relations hidden in the qualia roles of math objects. Algorithms were designed for EDG generation and quantity relation extraction to solve algebra story problems.
- 2017-2019 M.Sc. in Computer Science CCNU & UOW  
From 2017 to 2019, under the guidance of Prof. Xinguo Yu (CCNU) and Prof. Lei Wang (UOW), I completed my master's thesis while studying at Central China Normal University and the University of Wollongong.  
  
I first worked on an AI-based robot system for achieving educational aims, such as metacognition tutoring and geometrical thinking training, with characteristics of contextual teaching by mining knowledge from the real world. For metacognition tutoring in our system, objects in the real world are detected, and a set of learning materials associated with the objects is presented to learners. For geometrical thinking training, an automatic questioning-and-answering section is employed to engage the learner to think, carried by a voice interaction between learners and robots. In our experiment, a set of specific object images are captured to validate the feasibility and efficiency of the proposed system. My supervisor and I have published one IEEE conference paper.
- 2013-2017 B.Sc. in Software Engineering TYUT & NKNU

## Other education experiences

- 2019 The UOW study abroad and exchange program,2019.  
I studied 4 master's courses at the University of Wollongong in the School of Computing & Information Technology in Australia.  
Software Requirements, Specifications, and Formal Methods by Minjie Zhang, Computational Intelligence and dissertation co-supervisor by Lei Wang, and Data Mining and Knowledge Discovery by Markus Hagenbuchner.  
the University of Wollongong
- 2015 The NKNU study exchange program,2015.  
I studied 4 undergraduate's courses at the National Kaohsiung Normal University(NKNU) in the Department of Software Engineering and Management.  
the National Kaohsiung Normal University



## Research projects

- 2022-2023 [Host the Outstanding Doctoral Dissertation Incubation Program of Central China Normal University in 2022.](#)  
The research is based on a Qualia structure for solving algebraic word problems containing common-sense knowledge, focusing on the implied common-sense relations to extend the scope of solving problems. The research project direction is to combine the Qualia structure with the syntax-semantic model to establish connections between concepts and scenarios, which extends the application of machine solvers in **intelligent tutoring systems.** CCNU
- 2020-2023 [Participate in Research on Developing Enhanced Algorithms for Solving Algebraic Problems based on Deep Relational Networks.](#)  
Algorithms for solving algebraic problems are crucial technology in developing educational intelligent systems. This project suggests a batch of new methods against the issues in developing algorithms for solving algebraic problems, including the methods to enhance the performance of understanding problem and the performance of solving the group of acquired math relations, and the method for fusing the proposed new methods to establish high-performance algorithms for solving algebraic problems. National Natural Science Foundation of China
- 2023-2026 [Participate in Research on the Method of Human-Computer Intelligence Synergy in Guiding Algorithm Innovation for Graduate Students.](#)  
This project studies the key methods of human-computer intelligence synergy to guide graduate students to innovate algorithms by making use of the heterogeneity and complementarity of machine intelligence and human intelligence. National Natural Science Foundation of China

## Hao Meng Personal Statement

### Languages

code & writing



polite



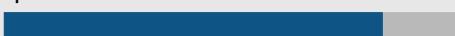
outgoing



good manners



pursuer of rabbits



lovely×4 narcissistic×3

Scale: 0 (basic skills) - 6 (expert).

## Mentorship and community services

- 2019-2022 Lecture teaching assistant CCNU-UOW joint institute  
During my Ph.D. studies, I have been working as a teaching assistant in CSIT940 (JI118) Research Methodology, CSCI944 (JI122) Perception and Planning, and CSCI920 (JI221) Contemporary Topics in Computer Science at CCNU-UOW joint institute.
- 2021-2022 Thesis research assistant CCNU-UOW joint institute  
I assisted Prof.Xinguo Yu in co-supervising the final-year undergraduate students and helped them finish the postgraduate master's thesis at CCNU-UOW joint institute.
- 2021-2022 International conference assistant CCNU foiae  
I was a member of the organization of the 9th IEEE International Conference on Teaching, Assessment, and Learning for Engineering (TALE 2021), China. And International Conference on Intelligent Education and Intelligent Research(IEIR 2022), China.

## Other information

I work objectively toward my goals in my professional career, work under the bounds of rules, ethics, and regulations of the institute and country, to strive for excellence in learning, research, and innovations. I am passionate about self-learning and subsequently transferring the acquired knowledge to the community through learning and publications. I am an advocate of objective-based teaching and learning and my goal is to facilitate learning, critical thinking, and problem-solving with diverse intellects, and to prepare them to take on the new challenges in academia, industry, and the general community as a whole.

# Hao Meng

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## Education

- 2019 – now **Ph.D. Central China Normal University** in Educational Technology.
- 2017 – 2019 **M.Sc. Central China Normal University and University of Wollogong** in Computer Science.
- 2013 – 2017 **B.Sc. Taiyuan University of Technology** in Software Engineering.

## Research Publications

### Journal Articles

- 1 H. M. Bin He and T. Zhang, “Qualia role-based quantity relation extraction for solving algebra story problems,” *Computer Modeling in Engineering and Sciences*, vol. 136, no. 1, pp. 403–419, 2023, ISSN: 1526-1506. DOI: 10.32604/cmes.2023.023242.

### Conference Proceedings

- 1 L. X. Hao Meng and Y. Xinguo, “Prompt-based missing entity recovery for solving arithmetic word problems,” in *2022 IEEE International Conference on Intelligent Education and Intelligent Research(IEIR)*, 2022.
- 2 X. X. Shishun Wu and B. H. Hao Meng, “An intelligent tutoring system for math word problem solving with tutorial solution generation,” in *2022 IEEE International Conference on Intelligent Education and Intelligent Research(IEIR)*, 2022.
- 3 X. Yu, L. Yan, H. Meng, and R. Peng, “Solving chemistry problems involving some isomers of benzene ring,” in *Artificial Intelligence in Education: Emerging Technologies, Models and Applications*, E. C. K. Cheng, R. B. Koul, T. Wang, and X. Yu, Eds., Singapore: Springer Singapore, 2022, pp. 77–87.
- 4 H. Meng, H. Wu, and X. Yu, “The context-oriented system based on electra for solving math word problem,” in *2021 IEEE International Conference on Engineering, Technology Education (TALE)*, 2021, pp. 976–981. DOI: 10.1109/TALE52509.2021.9678762.
- 5 H. Meng, T. Yang, and X. Yu, “A bi-channel math word problem solver with understanding and reasoning,” in *2021 IEEE International Conference on Engineering, Technology Education (TALE)*, 2021, pp. 29–34. DOI: 10.1109/TALE52509.2021.9678542.
- 6 X. Yu, Z. Lin, R. Peng, and H. Meng, “Solving organic chemistry problems described with text and chemical structure figure,” in *2021 IEEE 1st International Conference on Digital Twins and Parallel Intelligence (DTPI)*, 2021, pp. 114–117. DOI: 10.1109/DTPI52967.2021.9540084.
- 7 Z. Zhang, B. He, H. Meng, R. Liu, and C. Sun, “Entity-dependency graph enforced quantity relation extraction for solving arithmetic word problems,” in *2021 IEEE International Conference on Engineering, Technology Education (TALE)*, 2021, pp. 573–579. DOI: 10.1109/TALE52509.2021.9678767.
- 8 B. He, M. Xia, X. Yu, P. Jian, H. Meng, and Z. Chen, “An educational robot system of visual question answering for preschoolers,” in *2017 2nd International Conference on Robotics and Automation Engineering (ICRAE)*, 2017, pp. 441–445. DOI: 10.1109/ICRAE.2017.8291426.

## Skills

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| Languages | ■ Reading, writing and speaking competencies for English, Mandarin Chinese.  |
| Coding    | ■ Java, Python, R, L <sup>A</sup> T <sub>E</sub> X, ...  |
| Misc.     | ■ Academic research, teaching, training, consultation, L <sup>A</sup> T <sub>E</sub> X typesetting and publishing. |

## Research Interest

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Intelligent Tutoring System, Technology Enhanced Learning, and Educational Human-Computer Interaction, etc.