Yingjie Liu

PhD Applicant Fall 2023

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Research Area: Cognitive Diagnosis, Temporal Knowledge Tracing and Learning Prediction

Education Background

2018.09-2021.07 **Northeastern University**

Master of Engineering degree in Computer Application Technology. GPA: 3.38 / 4.0.

2014.09-2018.07 **ShanXi Normal University**

Bachelor of Science degree in Computer Science. GPA: 3.40 / 4.0.

Publications

- ***New Development of a Cognitive Diagnosis Model*** Yingjie LIU, Tiancheng ZHANG, Xuecen WANG, Ge YU, Tao LI. New development of cognitive diagnosis models. Front. Comput. Sci., 2023, 17(1): 171604 https://doi.org/10.1007/s11704-022-1128-3 (🔗)
- ***Evaluation of Quality of Interaction in Online Learning Based on Representation Learning ,*** Xuecen, W., Yu, Z., Yingjie, L., & Ge, Y. (2021). Evaluation of quality of interaction in online learning based on representation learning. Computer Science, 48(2), 207-211.(🔗)
- ***Research on Knowledge Proficiency Calculation Method Based on Bloom's Cognitive Theory*** (🔗)

Selected Research Projects

2019.04–2021.07 **Construction of Personalized Learning Environment Based on Big Data**

Description: Actively involved in the research project of Natural Science Foundation of China (NSFC): Research on the Construction of Personalized Learning Environment Based on Big Data.

- **Goal**: Use the educational big data of the observable response generated in the learning process to reverse the learner's unobservable learning cognitive proficiency data and strengthen the accuracy of personalized guidance.
- **Contribution**: 1) Proposed a computational model of knowledge proficiency based on Bloom's cognitive theory, BloomCDM; 2) The core of the modeling phase is to consider hierarchical priors, including "Remember," " Comprehension," and " Application," and the objective function of the model is determined to calculate the characteristic of students and questions; 3) In order to abstract the mathematical expression of " Comprehension" and " Application", the concept of "knowledge group" and "higher-order knowledge group" were also pioneered to improve the representation of educational theory in computational science.

2018.09–2020.07 **Learning-based Extraction of Knowledge Points and Cognitive Verbs from Exam Questions**

Description: Actively involved in the NSFC research project: Research on the Construction of Personalized Learning Environment Based on Big Data.

- **Goal**: Use the machine learning methods to extract knowledge points and cognitive verbs from high-school math questions using ensemble learning and convolutional neural networks.
- **Contribution**: 1) Gave a formal definition for the knowledge point labeling problem; 2) Proposed an ensemble learning model with multiple SVM kernels to accurately extract knowledge points and construct knowledge graphs for high-school math questions; 3) Conducted a comprehensive analysis of baseline models, including multilabel kNN, classifier chains, and binary relevance multilabel classification, and evaluated the proposed ensemble learning model. 4) The experiments demonstrate that the proposed model outperforms the baseline models by 2%-10% in terms of multiple evaluation metrics; 5) Designed a data augmentation-based labeling method that reduces the reliance on preparing training data. 6) Trained TextCNN, SGD, logistic regression, MLP, and XGBoost models to extract cognitive verbs and evaluated the performance of different models.

2020.11 – 2020.12 **Solving Elementary School Math Questions with Machine Learning**

Description: Participated in the China Computer Federation (CCF) Big Data and Computational Intelligence Competition in 2020 and won the second prize in the Tipaipai track (top 3%).

- **Goal**: Competition selected primary math grades 1-6 in-school questions as training and prediction data. The model read an application problem and outputs the result of the problem.
- **Contribution**: The model accuracy was optimized by pre-training model optimization and data cleaning. A lot of work has been done on data cleaning because there was a lot of noise in the original data, such as the question index in the question, two questions in one sentence and the confusion of Chinese numbers and English numbers, etc.

2019.05 – 2019.07 Zte Moon Algorithm Competition

Description: Participated in the deep learning circuit of the Moon Algorithm Competition held by ZTE in 2019 and finally won the regional winning award (top 10%).

- **Goal**: Without limiting the optimization method, this task is to output a new network model for a given deep convolutional network without deep convolutional network tuning training to reduce the model size and the resource occupation of operating devices and improve the running speed.
- **Contribution**: Through layer fusion, the idle and invalid filter was cleared, and layer fusion technology was used to improve the operation effect.

Work Experiences

2021.07 - Present Quality Assurance Engineer, Meituan

Responsibilities:

- Full-time job for the testing work of the Marketing department of Meituan and responsible for the server testing of the hotel and tourism business lines.
- Designed marketing campaign generation code and interface automation code using java.
- Responsible for continuous improvement of the stability and success rate of the test and production environment.
- Performed complex analyses of issues, avoided capital loss and managed escalations of issues.

Skills

- PL: Python, C/C++, Java, SQL, Bash, LaTeX
- ML Frameworks: PyTorch, Tensorflow, Keras
- ML Models: KNN, NLP, TextCNN, SVM, Lenet5, LSTM, AlexNet, GoogleNet, ResNet, DenseNet
- DevOps: Git, Travis CI, Docker, Junit
- TOEFL 96
- Self-motivated, ambitious, team player.
- Strong data statistics and analysis skills in industry and academia.
- Passion for educational technology.

Award & Honors & Certificate

During the graduate study:

- 2020, won the 2nd prize in the CCF Big Data and Computational Intelligence Competition.
- 2020, won the second-class academic scholarship of Northeastern University.
- 2019, won the regional Winning Prize (TOP20) in ZTE Moon Algorithm Competition.
- 2018, 2019 won the first-class academic scholarship of Northeastern University twice.

During the undergraduate study:

- 2017, got graduate admission qualifications.
- 2017, obtained the high school Information technology teacher qualification certificate.