Discovering Multi-Relational Integration for Knowledge Tracing with Retentive Networks

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1. Introduction

**Definition:** Knowledge Tracing (KT) focuses on estimating students’ knowledge states and predicting their future performances, which is a crucial task for online education platforms.

**Motivation:**
- Current KT models do not fully utilize the inter-exercises information and the advanced-relation question-skill information, which are key to the KT task.
- Psychological researches indicate that forgetting is a significant factor affecting students’ learning states, but some models miss it.

2. Proposed Model

![MRIKT framework](image)

**Fig. 1.** An overview of MRIKT framework. MRIKT consists of three key modules: graph representation module, retentive module, and prediction module.

3. Experiments

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**Table 1.** Comparisons of the AUC results of different models on the three datasets. The best results are highlighted in bold, while the second best results are underlined.

**4. Conclusion**

- This paper proposed MRIKT, a knowledge tracing model with multi-relational integration, which fully utilizes advanced-relation question-skill information, inter-exercise information, and forgetting factor.
- In comparison with other baseline models, MRIKT exhibits superior performance in comprehensive experiments and the associated ablation study conducted on three real-world datasets. And the model improves at least 8.44% compared to baseline models.