Research on High School Math Exercise Recommendation Based on Graph Neural Network

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Exercise Recommendation

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Introduction

Research Backgro

Existing Problems

Research Core

Proposed Model

ercise Knowledg



Overview

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- 2. Proposed Model Exercise Knowledge Labelling
- 3. Result

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Background

- Knowledge State Monitoring
- Learning Resource Recommendation
- High School Math

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Problems

Disorganized exercise Exercises lacking knowledge tags Knowledge evaluation Description of second item Exercise recommendation Description of third item

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Research Cores

Exercise knowledge labelling

A multi-knowledge point labeling algorithm for high school mathematics exercises based on bidirectional LSTM (Bi-LSTM) [1] and graph convolutional neural network (GCN) [3].

Knowledge tracing

A knowledge tracing model based on Transformer [5] architecture with graph attention network embedding.

Exercise recommendation

A mathematical exercise recommendation model based on Matching-Ranking [4] algorithm.

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Introd

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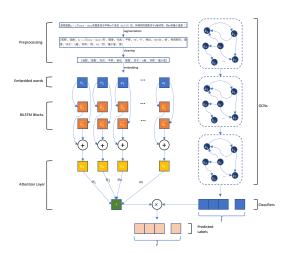
Proposed

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Exercise Knowledge Labelling

Architecture



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Resul

Figure: Model architecture

Exercise Knowledge Labelling

Modules

- 1. BERT [2] Embedding Layer
- 2. Attentional Bi-LSTM Text Representation
- 3. GCN-based Classifier

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Labelling

Block 1 content

Block 2

content

Block 3

content

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Exercise Knowledge

Table

Table: Table caption

Treatments	Response 1	Response 2
Treatment 1	0.0003262	0.562
Treatment 2	0.0015681	0.910
Treatment 3	0.0009271	0.296

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Theorem

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Result

Theorem (Mass-energy equivalence)

 $E = mc^2$

Figure

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Uncomment the code on this slide to include your own image from the same directory as the template .TeX file.

References I

Tao Chen, Ruifeng Xu, Yulan He, and Xuan Wang. Improving sentiment analysis via sentence type classification using bilstm-crf and cnn.

Expert Systems with Applications, 72:221–230, 2017.

Jacob Devlin, Ming-Wei Chang, Kenton Lee, and Kristina Toutanova.

Bert: Pre-training of deep bidirectional transformers for language understanding, 2019.

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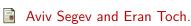
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References II



Context-based matching and ranking of web services for composition.

IEEE Transactions on Services Computing, 2(3):210–222, 2009.

Ashish Vaswani, Noam Shazeer, Niki Parmar, Jakob Uszkoreit, Llion Jones, Aidan N Gomez, Lukasz Kaiser, and Illia Polosukhin.

Attention is all you need.

arXiv preprint arXiv:1706.03762, 2017.

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The End