

easily integrated in the domain-specific courses like English for Scientific Communications. In addition, the experimental results from SRMS and pilot study has verified the effectiveness of the framework.

The limitations of this article are two issues. The first is that the number of participants in the pilot study is quite limited that more participants are needed to verify the framework. The second one is that the deep neural networks relies on high-performance computing devices (i.e., Graphical Processing Unit), so it will be expensive for the full deployment of flipped classroom.

There are mainly two directions for our future research. The first direction is to include more participants to examine the effectiveness of the framework. The second direction is to adopt the user profiles as training data for deep neural networks. By exploiting data in the user profiles, the AI-based tutor and interactive peer can have personalized answers for the students.

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