

KNOWLEDGE TRACING: A SIMPLIFIED ROAD MAP TO THE STATE OF THE ART

Jose Naranjo, Veronika Stoffova, Changsheng Zhu

Abstract: The current world situation has boosted the importance of online education and with-it platforms that provide computer-aided learning that enhances the students' autonomy in the learning process. Those platforms also promise broad access to world-class training while also lowering the rising cost of tuition.

Knowledge tracing is the process of predicting how pupils will perform in future encounters by modelling their knowledge across time. Learning models can be created using large-scale student trace data on prominent educational sites like Udemy, EdX, Coursera, etc. Furthermore, the learning model may be utilized to create clever curriculums and enables simple interpretation and finding of structures in student activities.

The learning process may be improved by suggesting resources to students based on their requirements, and information that is expected to be too simple or too difficult can be avoided or delayed. Therefore, in the field of online education, the problem of providing suitable material to students based on their current knowledge, learning rate and personal skills can be solved by different designs. Available designs are Dynamic Probabilistic Models (Partially Observable Markov Decision Processes), Recurrent Neural Networks, Bayesian Knowledge Tracing, etc. All these designs have advantages and disadvantages. We analysed the designs and proposed a synthesized road map towards the current state of the research that illustrates the strong and weak points of the existing designs.

Links to the academic articles and source code of freely available resources are provided. Additionally, future challenges are discussed at the end.

Keywords: Knowledge Tracing, Artificial Intelligence, Neural Networks.

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Contact address

Ing. Jose Naranjo, MSc.

Eötvös Loránd University (ELTE), Faculty of Informatics

1074 Budapest, Dohany u. 16-18. 1/2 floor 1/a.

e-mail: josenaranjo@inf.elte.hu; joseluisnaranjo@hotmail.es