We develop an intelligent system—LittleMU, which offers several unique functions. The system has been implemented online and has offered services to 8,000,000 students on XuetangX.com, one of the largest MOOC platforms in China.

User analysis

Forum activities. We identify important demographic features that have significant predictive power on user engagement considering forum activities. In particular, gender plays an important role. For example, Women are also more likely to ask questions in non-science courses but less likely to do it in science courses. Additionally, they spend more time on learning course material and doing assignment for non-science courses than science courses.

Learning behaviors. Firstly, we design an algorithm based on deterministic finite automaton to approximate effective learning time. Then we estimate each user’s effective learning time on a certain course. The analysis on effective learning time shows that female students spend significantly more time on both videos and assignments in non-science courses. For both science and non-science courses, bachelors work hardest among all education groups.

Course analysis

Concept Extraction. Given a course corpus, we extract course concepts in three steps:

1. Candidate Concept Extraction
2. Semantic Representation Learning
3. Graph-based Ranking

Prerequisite Relation Mining. Prerequisite relations essentially can be considered as the dependency among knowledge concepts. An example of prerequisite relations in MOOCs

Automated video navigation. We investigate how intelligent interactions can help improve study engagement on MOOCs. One important work we have done is automated video navigation, which aims at suggesting the end position when users jump back in MOOC videos leveraging users’ watching history and the features of videos. We found several interesting patterns and revealed the main factors that influence users’ navigation behavior. Based on the discoveries, we developed a methodology aiming to understand the user intention and to suggest the best positions for a jump-back. As for the future work, it is interesting to take account of dynamic behavioral information, textual or visual information.

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