Towards a Comprehensive AI Teaching Assistant Based on Course Forums

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Why Building AI Teaching Assistant for course forums?
Managing and monitoring the forums is tedious and repetitive. Jill Watson, an AITA for course forums developed by Dr. Ashok Goel in 2016 is a fully-automated program that reply to students’ posts with high sophistication, but it was only capable for replying posts. A human TA’s job also involves post processing, which can also be automated. This shows the importance of the development of a multi-functional post processing AITA which serves as a complement of Jill Watson.

AITA Structure

AITA Kernel Structure

Kernel Module Functionality and Implementation Illustration

A. Automatic Labeling System
The automatic labeling system is used to label the new posts into the pre-designed categories so that they can be processed by the following modules and be stored in the database.

B. Duplicate Posts Identifier
The duplicate posts identifier is used to identify duplicated forum posts and point students to the similar posts so that the student who asks the question does not need wait for the answers and the instructor does not need to answer the question again.

C. Incomplete Office Hours Requests Identifier
The incomplete office hours requests identifier is used to identify office hours requests that do not specify the meeting time or reason with the instructor so that the instructor do not need to spend the whole office hours session waiting for the student and can prepare for the student’s questions in advance.

D. Automatic Assignment Assistant
The automatic assignment assistant is used to help students will code implementation assignments. It can provide a line by line English translation of the solution code to the student so that students can make progress on the assignment without violating the course policy.

Implementation Pipeline
1. Collect data needed for each module
2. Clean data using different strategies
3. Extract features from the data, which is used as the learning material
4. Set up different prediction models
5. Train the prediction models using the features extracted and test using the test data

Summary and Future Work
1. This research presents different modules of a practical system that can be used to greatly alleviate instructors’ burden on online education forum posts processing.
2. Most modules achieved a highest accuracy of over 90%
3. Future work should focus on further increasing the accuracy, completing the other components of the AITA, and adding more functionalities.

References (Partial)