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Robert Benea
Christian Plagemann
Irina Blok

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Virtual Classroom Assistant for Question Answering in an Online Instructional Session

ABSTRACT

During an instruction session in a physical classroom, teachers often ask questions to the students in class. Since students in an online classroom are not co-present in the same location at the same time, online teachers do not face the constraint of needing to select individual students to answer a question. This disclosure describes virtual classroom assistant functionality that enables teachers who deliver online instructional content to pose questions to the set of students participating in an instructional session. The functionality can include delivery of questions to the students, collection and processing of their answers, and generation grades and feedback with or without the teacher’s assistance. Further, additional questions can be generated or selected based on student performance on previous questions.

KEYWORDS

- Virtual classroom
- Classroom assistant
- Online instruction
- Question-and-answer (Q&A)
- Personalized feedback
- Automated grading

BACKGROUND

During an instruction session in a physical classroom, teachers often ask questions to the students in class. The questions can serve different purposes, such as testing background knowledge, verifying student understanding of delivered instructional content, maintaining student engagement during the instruction session, etc. Typically, teachers select a single student
to answer a given question since multiple students in a shared physical environment cannot answer simultaneously. Teachers can select a student using any of a variety of schemes such as random selection, volunteering, pre-specified ordering, etc.

Online instructional delivery mimics physical classrooms in a number of ways. However, students in an online classroom environment are not co-present in the same location at the same time. As a result, teachers delivering instruction in an online class do not face the constraint of needing to select students to answer the questions posed during an instruction session.

**DESCRIPTION**

This disclosure describes techniques that enable teachers who deliver instructional content in an online classroom to pose questions to every student participating in an instructional session. With user permission, the techniques provide functionality of a virtual classroom assistant that delivers the questions to the students, collects and processes their answers, and displays the processed answers to the teacher for further input.

Specifically, the virtual classroom assistant can be used for automatically determining whether the answer submitted by each of the students is fully or partially correct. Alternatively, the received answers can be grouped based on an initial automatic tagging of correctness and presented to the teacher for manual confirmation of the tags, such as ‘correct,’ ‘partially correct,’ ‘incorrect,’ etc. In addition, teachers can be provided the ability to select one or more of the collected answers and display them to the students as examples of the various ways in which the question might be answered.
Fig. 1: Collecting, processing, and grading student answers in an online classroom

Fig. 1 shows an example of operational implementation of the techniques described in this disclosure. A teacher (102) poses a question (104) to students (106) during an instruction session in an online classroom. Each student answers the question independently and the collected answers (108) are processed automatically to determine whether they are correct. For instance, Fig. 1 shows the collected answers grouped based on whether they are correct, partially correct, or incorrect (110).

After marking correctness based on automated processing, students can be provided with automated grading and feedback (112) based on the results. Alternatively, or in addition, the results of automated correctness determination can be provided to the teacher (114) for manual verification. If necessary, the teacher can make corrections to the grades or automated answer grouping, and/or provide additional feedback and comments.
The teacher’s grading and feedback (116) can be passed along to the students. Further, the teacher can choose to show students one or more of the collected answers as illustrative examples (118). For instance, the teacher can use one or more of the collected answers for purposes such as demonstrating the variety of correct choices, highlighting common mistakes along with corresponding corrections, etc.

Further, the next question (120) asked to the students can be personalized based on performance on answering the previous question(s). For instance, the next question can be formulated to be related to the mistakes made in the answers to the previous question in order to provide students with the greater practice and reinforcement needed to learn how to avoid the mistake. The personalized questions can be generated automatically based on the lesson content and/or semi-automatically by selecting from a set of questions provided by the instructor.

The techniques described herein can be integrated within any platform or service used to deliver online instruction, such as a virtual classroom application, a collaboration application, a video conferencing application, etc. Implementation of the techniques with permission can enhance the online teaching and learning user experience (UX) for teachers and students, respectively.

Further to the descriptions above, a user may be provided with controls allowing the user to make an election as to both if and when systems, programs or features described herein may enable collection of user information (e.g., information about instructional material, questions and answers in a classroom, or grades), and if the user is sent content or communications from a server. In addition, certain data may be treated in one or more ways before it is stored or used, so that personally identifiable information is removed. For example, a user’s identity may be treated so that no personally identifiable information can be determined for the user, or a user’s
geographic location may be generalized where location information is obtained (such as to a city, ZIP code, or state level), so that a particular location of a user cannot be determined. Thus, the user may have control over what information is collected about the user, how that information is used, and what information is provided to the user.

CONCLUSION

This disclosure describes virtual classroom assistant functionality that enables teachers who deliver online instructional content to pose questions to the set of students participating in an instructional session. The functionality can include delivery of questions to the students, collection and processing of their answers, and generation grades and feedback with or without the teacher’s assistance. Further, additional questions can be generated or selected based on student performance on previous questions.

REFERENCES

2. Google Classroom: Grading and leaving feedback, available online at