September 2020

Dynamic Generation of Contextual Quizzes Based on Attentiveness to Online Learning

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ABSTRACT

Online learning often involves learners watching instructional content while sitting passively in front of their computers or mobile devices for long periods of time. Loss of focus during an online learning session can reduce the amount of material learned and/or require learners to rewind and re-watch the content during which they lost focus, thus having a negative impact on the user experience of online learning. This disclosure techniques to present dynamically generated quizzes whenever a learner's attention is deemed to have drifted away from online learning. The level of attention can be determined based on information from the device, obtained with user permission.

KEYWORDS

- Online learning
- Online instruction
- Learner focus
- Learner attention
- Attentiveness
- Online quiz
- Contextual quiz
- Personalized knowledge test
- Recurrent Neural Network (RNN)

BACKGROUND

Online learning has been steadily gaining adoption. Online learning often involves learners watching instructional content (streamed live or pre-recorded content) while sitting passively in front of their computers or mobile devices for long periods of time. In such situations, learners can get distracted and lose focus. Such loss of concentration can reduce the amount of material learned and/or require learners to rewind and re-watch the content portions during which they lost focus, thus having a negative impact on the user experience (UX) of online learning.

DESCRIPTION

This disclosure describes user-permitted techniques that operate dynamically to determine a learner's current attentiveness while watching online instructional content during a learning session. With the user's permission, the user's device(s) are used to detect the user's focus of attention. If the user is detected as likely not sufficiently focused on the online instruction, an alert is provided to draw the user's attention. Additionally, the user can be presented with an interactive quiz that includes questions automatically determined from the previously shown content which can help confirm that the user has absorbed the material.

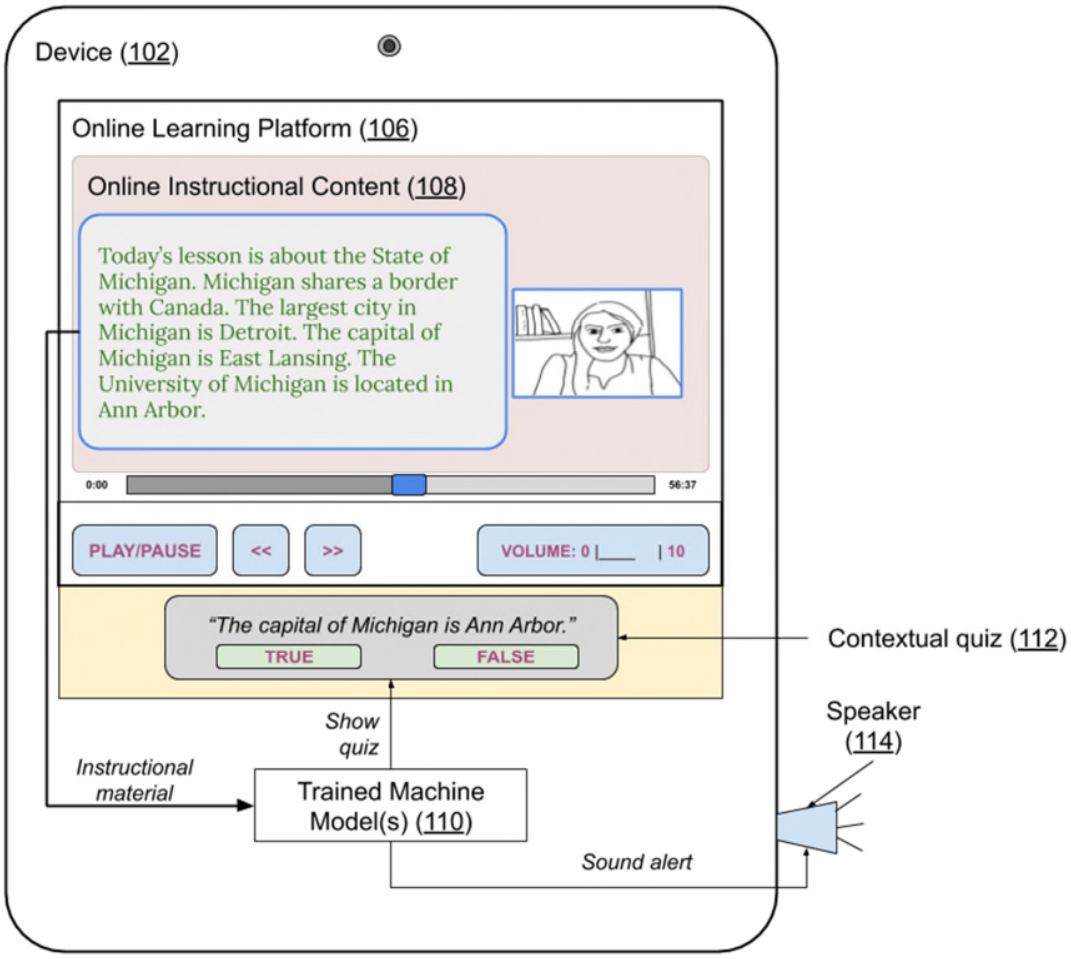

Fig. 1: Showing a quiz based on delivered online instruction based on user's attention

Fig. 1 shows an example of operational implementation of the techniques described in this disclosure. A user is using a device (102) to watch online instructional content (108) delivered via an online learning platform (106). In this example, the content is multimedia content and includes a presenter video as well as text, though any combination of content can be used. With the user's permission, the device is used to check the user's focus of attention on an ongoing basis.

Suitably trained machine learning models (110) or other techniques that utilize data from the device (e.g., data from sensors or lack of input from the user) are applied to determine

whether the user is sufficiently attentive to the online instruction. If the user's attention is deemed to have drifted away, a sound alert is played via the device speaker (114). Alternatively or in addition, the user is shown an interactive contextual quiz (112) with one or more questions determined from the instructional material the user has recently received during the ongoing online instructional session.

With user permission, the instructional content delivered during the online learning session is analyzed using a suitable machine learning model, such as a Recurrent Neural Network (RNN). The machine learning model produces as output a list of facts included within the delivered instruction. In the simplified example of Fig. 1, the facts presented are about the State of Michigan, including its border (“shared with Canada”), largest city (“Detroit”), capital (“East Lansing”), and the location of the University of Michigan (“Ann Arbor”).

The list of facts is utilized to automatically formulate one or more corresponding questions, each covering one or more of the facts in the list. One or more of the questions can be presented as part of a contextual interactive quiz within the online learning session. In the example of Fig. 1, the question is of a True/False question that the user can answer easily by selecting the appropriate button. Alternatively or in addition, the set of questions can be used in a dynamically generated test that is presented at the end of the instruction session. The selection of questions that are included in the test can be personalized such that each user receives a set of questions best suited to that person’s learning. Such contextual quizzes and final tests can additionally serve to measure the user’s learning of the delivered material.

The questions included in the test presented at the end of the instruction session can be selected to include topics covered during portions of the session where the user was considered to be the least attentive. Such operation can ensure that the user does not miss out on learning

specific parts of the instructional content owing to a lack of attention. The determination of user's can be performed locally on the user's device, e.g., by utilizing an on-device machine learning model or other suitable techniques.

The interactive quizzes can be shown using any suitable interactive user interface (UI) mechanism such as via a notification, as an overlay, in a dialog box, etc. In addition to or instead of sound, the user can be alerted of a drift in attention using other suitable notification mechanisms, such as popups, vibrations, text messages, etc. The threshold value used to determine the level of user focus can be specified by the developers and/or configured by the users and/or determined dynamically at runtime.

The techniques described herein can be implemented within any platform or service used for delivery of instructional material for online learning. Implementation of the techniques can enhance the learner's user experience and can boost learning outcomes. The techniques can be extended to other situations that require attentive user participation, such as webinars, online conferences, meetings, etc.

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 a user's social network, social actions or activities, profession, a user's preferences, or a user's current location), 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 techniques to provide alerts and to present dynamically generated quizzes whenever a learner's attention is deemed to have drifted away from online learning. The level of attention can be determined based on information from the device, obtained with user permission. The quizzes can include questions that are dynamically generated based on a list of facts generated by analyzing the delivered instructional content. With the permission of the user, the questions can be selected to cover topics covered during portions of the session where the user was the least attentive.