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Alan Wong

Vincent Lacey

Chaitanya Gharpure

Rebecca Hao

Priya Venkatraman

See next page for additional authors

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Inventor(s)

Alan Wong, Vincent Lacey, Chaitanya Gharpure, Rebecca Hao, Priya Venkatraman, Gal Elidan, Roe Engelberg, Lidan Hackmon, Roni Rabin, Michael Fink, Paxon Yu, Tiffany Yang, Vitaliy Dikker, and Adva Levin

Reading Comprehension Assessment Using LLM-based Chatbot

ABSTRACT

Users who are learning to read or learning about a topic by viewing content on a device can benefit from conversational activities, such as question-answer turns for the viewed content. This disclosure describes techniques to perform natural language assessments of content that is being consumed on a user device. A chatbot is implemented using suitable technology, such as a large language model. With user permission, the model is used to generate questions that evaluate the user's understanding of the content viewed. User provided answers are evaluated and suitable responses are provided to the user. The techniques enable automated assessment and feedback. The described features for assessment via chatbot (or virtual assistant) can be built into any application. Assessment is performed on-device and in a confidential manner.

KEYWORDS

- Reading comprehension
- Reading practice
- Reading buddy
- Electronic book
- e-book
- Chatbot
- Conversational experience
- Natural language assessment
- Large language model (LLM)
- Virtual assistant

BACKGROUND

Users view or otherwise consume large amounts of online content via devices such as smartphones, computers, smart speakers/displays, or other devices. While such devices are widely available, there are many people who do not have access or cannot use such devices. Users who are learning to read can benefit from conversational activities, such as comprehension questions. However, comprehension assessments, formal or otherwise, are not easily available.

DESCRIPTION

This disclosure describes techniques, implemented with user permission, to perform natural language assessments of content that is being viewed on a smart device. The techniques can be helpful for people who are learning to read and would benefit from an interactive learning experience and/or lack access to formal education where assessments are available.

A wide range of content such as text, audio, video, and multimedia can be viewed on devices such as smartphones, tablets, e-readers, laptops, etc. This disclosure describes techniques to evaluate the level of comprehension of the content being viewed by a user by using a chatbot, e.g., implemented using a large language model (LLM). Such a chatbot can be provided within whatever software is being used to consume the content (or as part of the device operating system).

The chatbot is configured to interface with the user regarding topics identified from the content that the user has viewed. For example, the user can be prompted with questions that check the user's understanding of facts mentioned in the viewed content. Users can also be asked for their opinions on particular topics, by having the chatbot analyze the viewed content and identify relevant topics from the content in question.

User responses to the questions can be analyzed using the LLM (e.g., by generating a prompt that the LLM answers whether the response matches the content) to determine the level of understanding shown by the user. The chatbot can respond to the answers submitted by the user indicating whether the answer was correct or offering help/ suggestions. Such ongoing conversation-based assessments can help provide an immersive educational experience to the user without the user having to be in a formal education space such as a classroom.

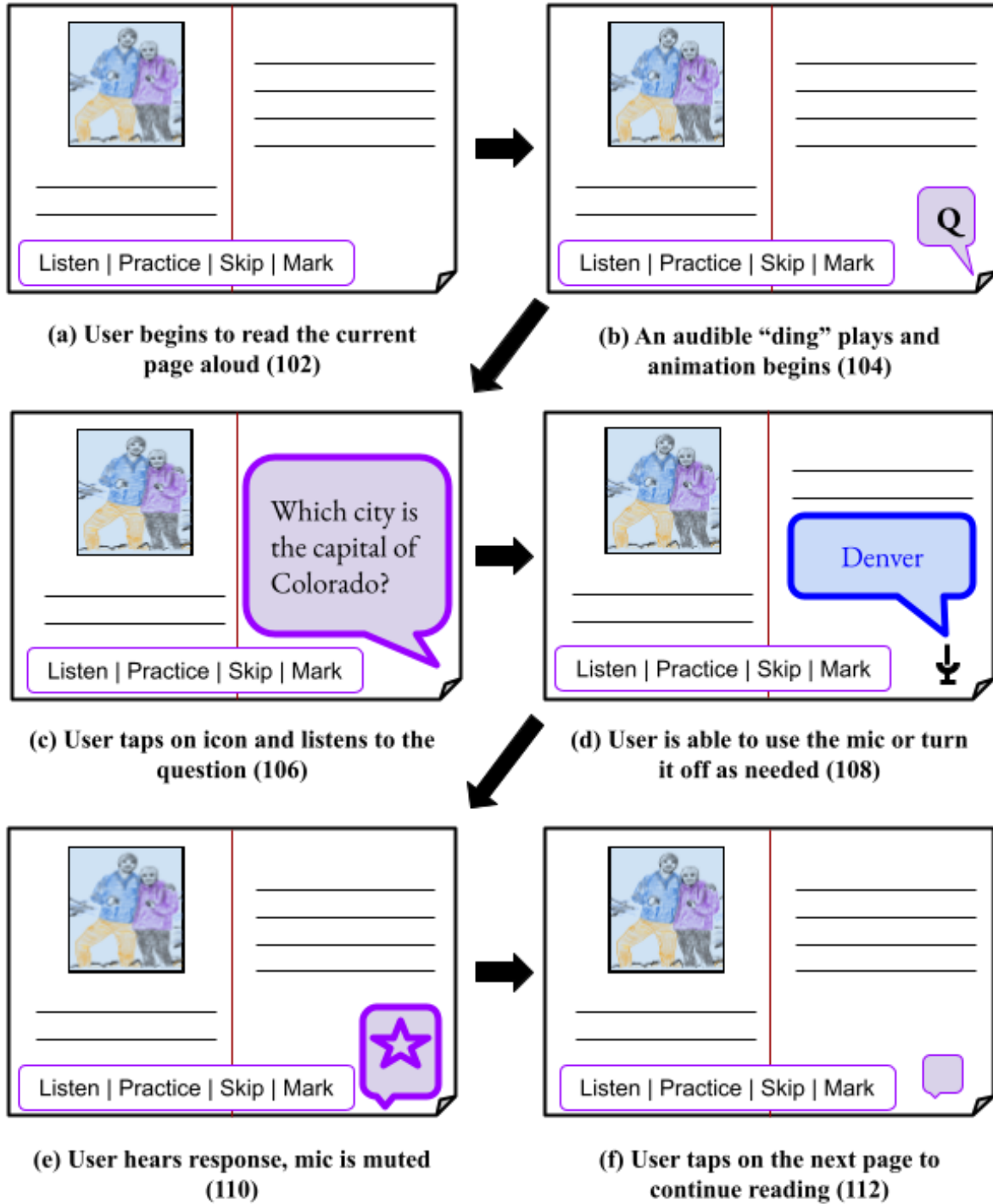


Fig. 1: Natural language assessment for viewed content

Fig. 1 illustrates an example sequence of natural language assessment for content viewed by a user. In this example, an LLM-based chatbot helps perform natural language assessment for a book that is being read by a user.

A user begins to read the page being currently displayed on the screen (102). An audible “ding” is played once the user has finished reading the page. An animation related to the first phase of the natural language assessment is displayed (104). This invocation trigger may differ across devices and users based on the specific device capabilities and configuration. The user can tap on the icon from the animation and listen to (or read) the question generated by the chatbot (106). For example, if the page of the book is about the state of Colorado, the chatbot may ask the user to specify the capital of the state of Colorado. The user can answer the question by using the microphone (108). The nature of the questions can differ based on context. For example, the user may be asked factual questions, opinion-based questions, or other types of questions.

The user can listen to the feedback provided by the chatbot (110). Visual affordances in the user interface can help make clear to the user about whether the chatbot is in listening mode or in speaking mode. The nature of the feedback itself may also be tailored based on user preferences. For example, some users may prefer detailed feedback, while others may prefer short, succinct answers. Once the conversation is complete, the user can choose to continue reading by moving on to the next page (112).

The features for assessment via chatbot (or virtual assistant) can be built into any application, e.g., a book-reading application or other content application. Assessment is performed on-device and in a confidential manner. Users are provided with controls to enable or disable assessments, to select the type of questions, and to tune the level of feedback.

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 content viewing activity, interaction with a chatbot, 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

Users who are learning to read or learning about a topic by viewing content on a device can benefit from conversational activities, such as question-answer turns for the viewed content. This disclosure describes techniques to perform natural language assessments of content that is being consumed on a user device. A chatbot is implemented using suitable technology, such as a large language model. With user permission, the model is used to generate questions that evaluate the user's understanding of the content viewed. User provided answers are evaluated and suitable responses are provided to the user. The techniques enable automated assessment and feedback.

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