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# SYNCHRONIZATION OF A SLIDE PRESENTATION AND PRESENTATION VIDEO RECORDING

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## **SYNCHRONIZATION OF A SLIDE PRESENTATION AND PRESENTATION VIDEO RECORDING**

A document application, such as a presentation application, enables users to create and edit documents, such as slides of a slide presentation document, as well as present portions of the documents to an audience as part of a live presentation. A content generation application may enable users to generate video (and/or audio) content of the slide presentation as the slides are being presented. After the presentation video has been generated, the slide presentation document and the presentation video can be made available for consumption by one or more viewers, including audience members that attended the live presentation or viewers that did not attend the live presentation.

Often, viewers do not watch the full presentation video and would rather view one or more portions of the presentation video that correspond to specific slides of interest to the viewer. In order to watch a portion of the presentation video corresponding to a slide of interest, the viewer may open the slide presentation document through a first user application and the presentation video through a second user application. The viewer may search a timeline of the presentation video to locate the portion of the video content corresponding to the slide of interest. This can be a time consuming process for the viewer, as the viewer may not easily locate the portion of the video content corresponding with the slide of interest on the presentation video timeline. Additionally, because the slide presentation document and the presentation video are provided via separate user applications, the user may not be able to efficiently switch between interacting with the slide presentation document and the presentation video, in order to locate the portion of the video content corresponding with the slide of interest.

Therefore, a technique is proposed for assisting a viewer in consuming, via a single user application, one or more slides of interest from a slide presentation document and a portion of a

presentation video corresponding with the slides of interest. The following description uses a slide presentation as an example document type to which the proposed technique can be applied. It should be noted, however, that the proposed technique can be applied to various other types of documents, including, for example, text documents, spreadsheets, etc.

The proposed technique can be implemented by a document application, such as a presentation application, and a content generation application. The document application and the content generation application may be a web application accessible via a web browser hosted by a user device, a mobile application hosted by a user device, or a desktop application hosted by a user device. In some examples, the document application can provide one or more of a document editing component (i.e., enabling a user to create and/or edit documents, such as slide presentations), a document presentation component (i.e., enabling a user to present documents to an audience), and a viewer consumption component (i.e., enabling a viewer to consume portions of a document and/or a presentation video corresponding to the document). The content generation application can provide a recording component, which enables a user to record video and/or audio content from a live presentation. In other examples, the document editing component, the document presentation component, and/or the viewer consumption component can be implemented through separate document applications, each provided by a cloud-based content management platform. Additionally, the recording component of the content generation application can be implemented through an application that provides at least one component of the document application.

The document application may receive a request to present the slides of a slide presentation document. In response to receiving the request, the slides may be displayed in a presentation mode (i.e., a mode of the document application that facilitates the presentation of a

slide presentation document via a user interface (UI)). In some embodiments, a recording function may be initiated responsive to the slides being displayed in a presentation mode. The recording function may be provided by the document application or the content generation application. In response to initiating the recording function, one or more timestamp bookmarks may be generated, where each timestamp bookmark corresponds to a slide of the slide presentation document and a location on a timeline associated with the recording in which the corresponding slide was presented to the audience. For example, if slide 1 is displayed at the beginning of the presentation, a first timestamp bookmark may be generated corresponding to a location of 00:00:00 (e.g., hr:min:sec) on the generated video timeline. If the presenter transitions from slide 1 to slide 2 approximately 1 minute after the presentation begins, a second timestamp bookmark may be generated corresponding to a location of 00:01:00 on the generated video timeline. After the video recording has ended, the set of generated timestamp bookmarks may be saved to a timestamp bookmark file corresponding with a file for the slide presentation document. A mapping of each timestamp bookmark to a corresponding slide of the slide presentation document (e.g., a combination of the timestamp and a corresponding slide's identifier) may be generated and saved to the timestamp bookmark file.

After the timestamp bookmarks and the mapping to the slides have been saved, the slide presentation document and/or the presentation video may be made available for consumption by a viewer via a viewer consumption component of the document application. One or more presentation slides of the slide presentation document may be displayed via a first portion of a UI of the document application, and the presentation video may be displayed via a second portion of the UI. The viewer may select a specific slide of interest from the one or more presentation slides displayed in the first portion of the UI. Responsive to receiving the viewer selection, a timestamp

bookmark mapped to the selected slide of interest may be identified. Based on the identified timestamp bookmark, the viewer consumption component may identify a location on the timeline of the presentation video that includes content associated with the selected slide. The viewer consumption component may then cause a portion of the presentation video, beginning at the identified timeline location, to be displayed in the second portion of the UI. In accordance with the above described example, if a user selects slide 2, the viewer consumption component may identify the timestamp bookmark that is mapped to slide 2. Based on the identified timestamp bookmark, the viewer consumption component may identify the location of 00:01:00 on the presentation video timeline. The viewer consumption component may then cause a portion of the presentation video beginning at 00:01:00 to be displayed in the second portion of the UI.

Figure 1 illustrates a flow diagram method for producing a synchronized slide deck and video content item. First, at block 110, a recording component of either a document application or a content generation application may receive a request to generate a video (and/or audio) recording of a slide presentation. In one example, a user of the document application may request a video recording to be generated by requesting the slide presentation document to be displayed in a presentation mode, causing a video recording function to be initiated. In another example, the user may request the video recording to be generated by interacting with a UI element of the document application UI associated with initiating a video recording.

At block 120, the recording component may cause a video and/or audio recording of the slide presentation to be generated. The recording may be generated as part of a recording function of the document application or the content generation application. In one example, the recording function may include generating a video of the slide presentation which displays the slides as presented to viewers during the slide presentation. The recording function may also

include generating a video, using an external camera apparatus that records how a presenter presents the slides to an audience. The recording function may also include generating an audio recording of the live presentation corresponding with the video recording.

While the slide presentation recording is generated, a set of timestamp bookmarks may also be generated, where each timestamp bookmark corresponds with a location of a timeline associated with the generated video recording. Each timestamp bookmark is associated with a slide of the slide presentation document and can indicate a location on the timeline relative to the beginning of the presentation in which the associated slide was displayed.

In one example, the presenter of the slide presentation may not present the slides in numerical order while the video recording is generated. For example, instead of displaying slides 1, 2, and 3 in numerical order, the presenter may display slide 3 before slide 2. A measurement may be generated for an amount of time each slide is displayed during the presentation. If the time measurement for a given slide falls below a time threshold, the document presentation component may remove the timestamp bookmark associated with the given slide from the set of timestamp bookmarks. If the time measurement for the given slide exceeds the time threshold, the document presentation component may not remove the timestamp bookmark associated the given slide from the set of timestamp bookmarks, even if the given slide was displayed outside of the numerical order of the slides in the slide presentation document.

At block 130, the generated timestamp bookmarks may be mapped to associated slides of the slide presentation document. The mapping of the timestamp bookmarks and the slides may be generated in real time while the video recording of the slide presentation is being generated, or may be generated after the video recording of the slide presentation has ended, as described with respect to block 150. At block 140, the document presentation component may receive a

request to stop generating the video recording of the slide presentation. The video recording function may be terminated responsive to the slide presentation exiting the presentation mode. In another example, the video recording function may be terminated responsive to a user interacting with a UI element of the document application.

At block 150, the document presentation component may complete any post-recording processing tasks as provided by the document application. For example, a post-recording processing task may include generating a mapping of the timestamp bookmarks to corresponding slides of the slide presentation document. The generated mapping of the timestamp bookmarks may be saved in a timestamp bookmark file corresponding with a file for the slide presentation document. In another example, a post-processing function may further include generating a presentation transcript corresponding to an audio recording of the slide presentation, where the presentation transcript includes text corresponding to the content of the audio recording. In some implementations, a mapping may be generated of the set of timestamp bookmarks and a portion of the presentation transcript associated with a slide of the slide presentation.

At block 160, the slide presentation document and the presentation video may be made available for consumption through a viewer consumption component of the document application. In one example, a copy of, or an address to (i.e., a URL), the presentation document and the presentation video may be transmitted to one or more viewers (i.e., via electronic mail (e-mail), etc.). One or more slides of the presentation document may be displayed in a first portion of an integrated UI of the document application and the presentation video may be displayed in a second portion of the integrated UI.

At block 170, the viewer consumption component may receive a request to view a slide of interest from the presentation slide document. The viewer may select a specific slide of

interest from the one or more slides displayed in the first portion of the UI. Responsive to receiving a selection of a slide of interest, the viewer consumption component may identify a timestamp bookmark that is mapped to the selected slide. Based on the identified timestamp bookmark, the viewer consumption component may identify a location on a timeline of the presentation video in which the slide of interest is displayed. At block 180, the viewer consumption component may cause a portion of the presentation video that begins at the identified time index to be displayed in the second portion of the UI, while the slide of interest is being displayed in the first portion of the UI.

The viewer consumption component may similarly change the slide displayed in the first portion of the UI to correspond with the slide displayed and/or presented in the presentation video in the second portion of the UI. For example, if the viewer had previously selected slide 2 as a slide of interest, as discussed above, a first portion of the presentation video may be displayed in the second portion of the UI beginning at the location of the presentation video timeline identified by a first timestamp bookmark that corresponds with selected slide 2. If, while the presentation video is being played for the viewer, a second timestamp bookmark is detected corresponding to a different location of the timeline, the viewer consumption component may identify a mapping between the second timestamp bookmark and a slide of the slide presentation (i.e., slide 3), indicating a transition from slide 2 to slide 3 in the presentation video. Responsive to identifying the second timestamp bookmark and the mapping of the second timestamp bookmark to slide 3, the viewer consumption component may cause the mapped slide (i.e., slide 3) to be displayed in the first portion of the UI.

The slide presentation document may be modified after the presentation video is generated. A viewer accessing the modified slide presentation document and the presentation



video may be provided with a notification via a third portion of the UI regarding the modification to the slide presentation document. For example, if a viewer selects an edited slide as a slide of interest, a notification may be provided indicating that the content of the selected slide may not correspond with the content of the corresponding slide displayed in the presentation video. If the viewer selects an added slide as a slide of interest, a notification may be provided indicating that the presentation video may not include a content portion corresponding to the selected slide. If a slide has been removed from the slide presentation document, the viewer consumption component may receive an indication regarding the removed slide. Responsive to receiving the indication, the viewer consumption component may identify a timestamp bookmark mapped to the deleted slide. If, while the presentation video is being played for the viewer, the identified timestamp bookmark is detected on the presentation video timeline, a notification may be provided to the viewer via the third portion of the UI indicating that the presentation video may include a content portion of a slide that is not included in the slide presentation document displayed in the first portion of the UI.

In one example, the integrated UI of the document application may include a fourth portion, where a presentation transcript may be displayed in the fourth portion of the UI. Each of the timestamp bookmarks may be mapped to a portion of the presentation transcript associated with a slide of the slide presentation. In some examples, responsive to receiving a request to view a slide of interest from the slide presentation document, a first portion of text of the presentation transcript associated with the slide of interest may be highlighted. Similarly, the viewer consumption component may highlight a second portion of text of the presentation transcript responsive to a transition from the slide of interest to a different slide, in accordance with examples previously described.

## **ABSTRACT**

A technique is proposed for assisting a user with presenting and recording a slide based presentation on a cloud-content based platform. A document application provided by the cloud-content based platform receives a request to record a video of a slide presentation. During the slide presentation, the document application generates a set of timestamp bookmarks, where each timestamp bookmark corresponds with a slide of the slide presentation document. At the end of the presentation, the video recording terminates and the slide presentation and the recorded presentation video is made available for consumption by one or more viewers. During consumption, the viewer is able to select a slide of interest and, based on the user selection, the application will present the viewer with the portion of the video recording that has the time stamp associated with the selected slide.

Keywords: presentation assistant, synchronized slide presentation, integrated user interface, intelligent document presentation

