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User Interface for Improved Fine-grained Video Scrubbing

ABSTRACT

When watching a video, users may need to move backward or forward through the video to find a specific moment within the video. Such movement is supported by buttons in the user interface (UI) or a scrubber. However, these mechanisms are unsuitable when making a fine-grained selection of a specific moment within a video. This disclosure describes user interface techniques that make it easier for users to engage in fine-grained video scrubbing to find and move to an exact moment within video content. A fine scrubbing mode is provided that a user can enable by pulling up on the scrubber and releasing it when it snaps. In this mode, video playback is paused, the scrubber bar is raised to a higher size and resolution, and a film strip of thumbnails of frames corresponding to the current position of the video is displayed. The user can engage in fine scrubbing by actions such as tapping a specific thumbnail, sliding left or right on the thumbnail strip or the scrubber bar, or dragging the scrubber. Tapping on a thumbnail within the strip results in scrolling that thumbnail to the center of the strip. Tapping, sliding, or scrubbing via the thumbnail strip correspondingly updates the video frame in the player in sync with the position of the scrubber within the thumbnail strip.

KEYWORDS

- Video scrubbing
- Fine-grained scrubbing
- Video seeking
- Video scrolling
- Fast forward
- Rewind
- Scrubber bar
- Scrubber knob
- Video playback
- Playback control

BACKGROUND

When watching a video, users may need to move backward or forward through the video to find a specific moment within the video. For instance, users may wish to rewind video content to rewatch a specific portion, fast forward to avoid undesired sections, skip to a scene of interest, watch from a given thumbnail or spoken dialog, etc.

To move within the video content, users can employ corresponding buttons in the user interface (UI) or interact with the scrubber bar provided by the video player. For example, a horizontal slider control is that displays the length and progress of the video playback commonly provided in video players. The width of the scrubber bar matches the horizontal width of the video display. A scrubber knob within the scrubber bar indicates the current position within the video playback.

Users can interact with the scrubber and/or the scrubber bar to seek content at any position by moving backward and forward within the video. For example, users can double tap the scrubber bar to seek a specific part of the video. As appropriate, users receive guidance to make them aware of available scrubbing actions. For example, when scrubbing a video with chapters, an overlay message can inform the user that entire chapters can be skipped with a specific gesture, e.g., double tapping with two fingers.

However, it is difficult to make fine-grained selection of a specific moment within a video using such UI buttons or scrubber. Such selection is especially challenging when the video is relatively long since the length of time associated with each marginal move of the scrubber knob increases with the length of the video.

DESCRIPTION

This disclosure describes user interface techniques that make it easier for users to engage in fine-grained video scrubbing to find and move to an exact moment within video content. Per the techniques, a fine scrubbing mode is provided that a user can enable by pulling up on the scrubber and releasing it when it snaps.

When a user enters fine scrubbing mode, video playback is paused, the scrubber bar is raised to a higher size and resolution, and a film strip of thumbnails of frames corresponding to the current position of the video is displayed below the scrubber bar. The user can engage in fine scrubbing by actions such as tapping a specific thumbnail, sliding left or right on the thumbnail strip or the scrubber bar, or dragging the scrubber. Tapping on a thumbnail within the strip results in scrolling that thumbnail to the center of the strip. Tapping, sliding, or scrubbing via the thumbnail strip correspondingly updates the video frame in the player in sync with the position of the scrubber within the thumbnail strip.

After identifying the desired moment in the video via fine scrubbing as above, the user can tap the play button or a bar at the center of the thumbnail strip to confirm the seek to the selected point within the video to begin playback from that point. Alternatively, the user can exit the fine scrubbing mode by swiping down on the scrubber or tapping a close button to cancel fine scrubbing. Canceling closes the thumbnail strip and returns to the playback mode at the original playback location without any change.

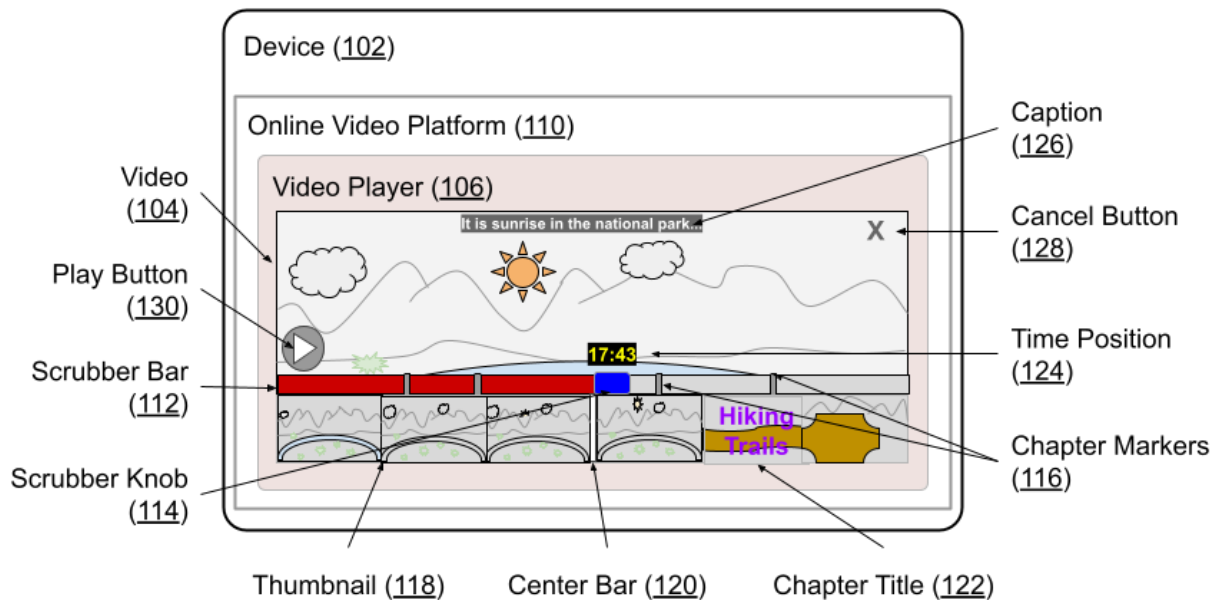


Fig. 1: Fine scrubbing mode to scroll video content to seek a specific position

Fig. 1 shows an example of operational implementation of the user interface for fine scrubbing. A user wishes to scroll to a specific moment in a video (104) while using device (102) to watch the video with captions (126). For example, the user can watch the video via a video player (106) provided via a website or application from an online video platform (110).

The user invokes the fine scrubbing mode by pulling up on the scrubber knob (114, in blue) within the scrubber bar (112, in red and grey). A strip of thumbnails (118) is shown below the raised scrubber bar with a center bar (120, blue) marking the frame at the current time position (124). Thumbnails for the beginning of a chapter include overlays showing the chapter title (122) corresponding to the chapter markers (116) within the scrubber bar.

The user can scroll to the desired frame by tapping or dragging on the thumbnails or the scrubber bar or knob. Upon locating the frame for the desired location within the video, the user can tap the “Play” button (130) to start playback from that location. Alternatively, the user can

tap the “Cancel” button (128) to exit the fine scrubbing mode and resume playback at the video position prior to entering the fine scrubbing mode.

As Fig. 1 shows, the scrubber bar is segmented into chapters for videos that contain chapters. A specifically formatted thumbnail can be shown within the thumbnail strip between the last frame of one chapter and the first frame of the subsequent chapter. For instance, a chapter boundary can be indicated by a thumbnail of a frame with a 16:9 aspect ratio that displays the title of the upcoming chapter as an overlay on faded black background. Alternatively, or in addition, the chapter name can be overlaid on the first thumbnail of the chapter. In addition, when fine scrubbing is invoked near the beginning or end of the video, blank thumbnails can be shown within the strip to indicate locations without content before the beginning or after the end of the video. If the user is watching the video with captions turned on prior to entering the fine scrubbing mode, the thumbnail strip and the paused video frame display the corresponding captions, thus enabling the user to seek content based on the spoken dialog within the video.

The fine scrubbing user interface can optionally include a feature to display transient overlay messages within the video playback UI to make the user aware of the fine scrubbing mode and provide relevant operational guidance. Such guidance can appear when a user starts moving within video content in normal seeking mode and can fade when the user stops scrubbing. The transient overlay messages can inform the user that sliding the scrubber up can invoke fine scrubbing.

Thumbnails displayed in the fine scrubbing mode can be loaded only once when the user initiates fine scrubbing and cached for the rest of the playback session. Time separation between

two successive thumbnails in the strip can be set by the developer of the video player and/or specified by the user and/or determined dynamically at runtime.

The fine scrubber user interface can support playback in portrait as well as landscape viewing orientation of the screen. The user interface can be implemented to enable fine-grained video playback control on any device, in any video application, in a web browser, or video content platform. For instance, the user interface can be provided within a standalone video player application, in video players embedded within a web page, etc. Implementation of the techniques described in this disclosure can simplify the interaction and thereby, improve the user experience of seeking specific moments within video content.

CONCLUSION

This disclosure describes user interface techniques that make it easier for users to engage in fine-grained video scrubbing to find and move to an exact moment within video content. A fine scrubbing mode is provided that a user can enable by pulling up on the scrubber and releasing it when it snaps. In this mode, video playback is paused, the scrubber bar is raised to a higher size and resolution, and a film strip of thumbnails of frames corresponding to the current position of the video is displayed. The user can engage in fine scrubbing by actions such as tapping a specific thumbnail, sliding left or right on the thumbnail strip or the scrubber bar, or dragging the scrubber. Tapping on a thumbnail within the strip results in scrolling that thumbnail to the center of the strip. Tapping, sliding, or scrubbing via the thumbnail strip correspondingly updates the video frame in the player in sync with the position of the scrubber within the thumbnail strip.