Technical Disclosure Commons

March 20, 2018

Inserting Pictures In Video Content

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INSERTING PICTURES IN VIDEO CONTENT

ABSTRACT

Disclosed herein is a mechanism for inserting pictures in video content. The mechanism can, for example, identify a portion of a video content item that is suitable for insertion of a picture. For example, the mechanism can identify a portion of a video content item in which an area of pixels is deemed to be relatively still or without motion across frames of the video within the portion of the video content item. The mechanism can identify one or more pictures to be inserted in the video, for example, based on colors of the video and the one or more pictures and/or based on a topic associated with the video. The mechanism can then generate a modified video by inserting the one or more pictures into the identified portion of the video. The mechanism can store the generated modified video and/or cause the generated modified video to be presented on a user device.

BACKGROUND

Users frequently view videos hosted by and shared via video sharing services. In some cases, a video on a video sharing service may be a candidate to have a picture (e.g., an advertisement, and/or any other suitable type of picture) inserted within the video. For example, the video may be a video that is primarily audio content, where the video content is primarily a static background. As a more particular example, a video may primarily include music, where a static background includes album cover art. In such cases, a picture may be inserted into the video without decreasing a viewer's enjoyment of the video. However, it can be difficult to identify videos or portions of videos that are suitable candidates for insertion of picture content. Thus, there is a need for a better approach to insert pictures in video content.

DESCRIPTION

A video content provider (e.g., a video hosting service, a streaming service, and/or any other suitable video content provider) can use the mechanisms to analyze a set of videos and determine a subset of videos that may be suitable candidates for inserting picture content.

FIG. 1 is an illustrative example of a method for inserting pictures in video content. The method can be performed by a system that provides video content, such as a server that hosts and streams video content to user devices.
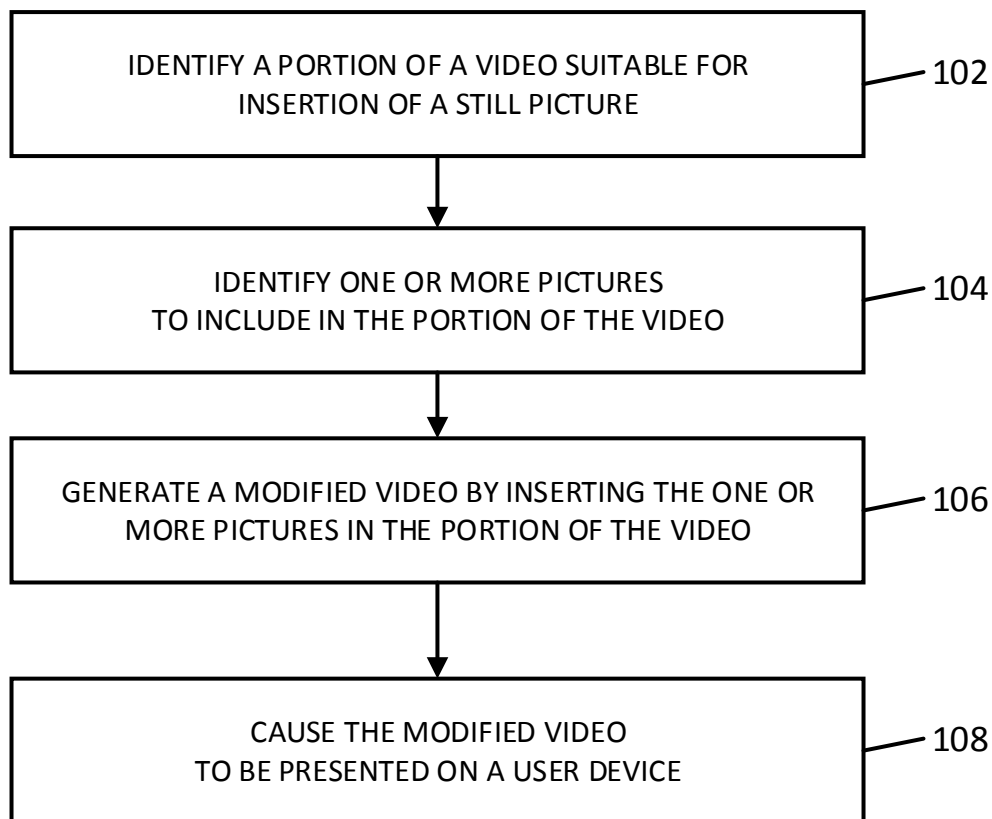

FIG. 1

At step 102, the server can identify a portion of a video that may be suitable for inserting a picture. In some instances, the video can be a video that is hosted on any suitable video sharing service.

The server can identify the portion of the video based on any suitable criteria or information. For example, the server can identify a portion of the video where video content of the video is relatively still. As a more particular example, the server can identify a portion of the video where a region or area of pixels does not move relative to a particular coordinate of the video. As a specific example, the server can identify a portion of the video where an area of pixels does not move relative to any suitable (x, y) coordinate of the video, such as a center of the video, an edge pixel of the video, and/or any other suitable coordinate. As another more particular example, the server can identify a portion of the video where an area of pixels moves in unison and below a predetermined speed or rate over successive frames of the video.

In some instances, the server can identify a portion of the video where the area of pixels is relatively still for at least a predetermined number of frames (e.g., at least 100 frames, at least 200 frames, and/or any other suitable number) and/or for at least a predetermined duration of time when the video is rendered (e.g., at least one second, at least five seconds, and/or any other suitable duration of time). Note that, in some instances, the server can identify a portion of the video of that spans any suitable duration of the video (e.g., one second, two seconds, five seconds, ten seconds, and/or any other suitable duration). Additionally, note that, in some instances, the server can identify an area of pixels within the portion of the video that is of any suitable size.

At 104, the server can identify one or more pictures that can be inserted in the identified portion of the video. In some instances, the server can identify pictures of any suitable format

and with any suitable characteristics (e.g., black and white pictures, grayscale pictures, color pictures, still pictures, animations, and/or any other suitable characteristics).

The server can identify the one or more pictures based on any suitable criteria or information. For example, the server can identify one or more pictures that include similar colors as those included in the identified area of pixels within the identified portion of the video. As a more particular example, in an instance where the area of pixels includes only black and white, the server can identify one or more black and white pictures. As another more particular example, in an instance where the area of pixels includes particular colors, the server can identify one or more pictures having colors that are the same or similar to the particular colors.

As another example, the server can identify the one or more pictures based on a topic or theme associated with the video. As a more particular example, the server can identify one or more pictures that advertise products or services related to a topic of the video (e.g., an advertisement for pet food in an instance where the video relates to pets, and/or any other suitable products or services related to a topic of the video). As another more particular example, the server can identify one or more pictures that advertise products or services relevant to a demographic group that has predominantly viewed the video.

As yet another example, the server can identify one or more pictures that are similar in size to a size of the area of pixels within the portion of the video. As a more particular example, in an instance where the area of pixels within the portion of the video is 200 pixels x 200 pixels, the server can identify one or more pictures that are within any suitable margin (e.g., within 100 pixels x 100 pixels, and/or within any other suitable margin) of the size of the area of pixels. Note that, in some instances, the server can identify one or more pictures with a similar shape and/or aspect ratio as the area of pixels.

At 106, the server can generate a modified version of the video by inserting the one or more identified pictures into the identified portion of the video. For example, the server can insert one of the pictures into the area of the pixels within the identified portion of the video such that the picture is contained entirely within the area defined by the area of pixels. Note that, in some instances, the server can resize the one or more pictures in any suitable manner such that the picture is contained within the area of pixels. In some instances, the server can insert the one or more pictures across any of the frames corresponding to the portion of the video. For example, in an instance where the portion of the video includes a particular number of frames (e.g., 100 frames, 200 frames, and/or any other suitable number), the server can insert the one or more pictures into each of the frames corresponding to the identified portion of the video. Note that, in some instances, the server can insert a first picture into a first subset of the identified portion of the video and can insert a second picture into a second subset of the identified portion of the video. For example, in an instance where the identified portion of the video includes 100 frames, the server can insert a first picture of the one or more pictures into a first subset of the 100 frames (e.g., in the first 50 frames, and/or any other suitable subset) and a second picture of the one or more pictures into a remainder of the 100 frames.

Note that, in some instances, the server can select any suitable subset of the one or more pictures. For example, in some instances, the server can determine a number of pictures that are to be inserted in the video (e.g., based on a duration of time of the identified portion of the video, and/or based on any other suitable information), and can select the pictures from the one or more pictures based on the number of pictures that are to be inserted. In some instances, the server can select the subset of the one or more pictures based on any suitable criteria, such as a relevance of the picture to the video, a quality of the picture, and/or based on any other suitable criteria.

In some instances, the server can store the modified video in any suitable manner. For example, in some instances, the server can store the modified video on a storage device associated with a video sharing service that hosts the original video. Additionally, in some instances, the server can notify a creator of the original video that a modified video that includes inserted pictures has been generated. In some such instances, the creator of the original video can select whether the original video, the modified video, or both videos are to be available to viewers that request the video.

At 108, the server can cause the modified video to be presented on a user device. For example, in some instances, the server can stream the modified video from a server hosting the modified video to the user device. In some instances, the server can cause the modified video to be presented on the user device in response to receiving a request to present the video from the user device. In some instances, a user of the user device can be given an option to view the original video or the modified video, and the modified video can be presented in response to receiving a selection of the modified video from the user device. Conversely, in an instance where a user of the user device selects the original video for presentation instead of the modified video, the original video can be presented on the user device.

Note that, in some instances, the server can loop through any suitable group of videos (e.g., videos hosted on a video sharing service, videos that have been recently uploaded to a video sharing service, and/or any other suitable group of videos) and can perform the techniques described above in connection with FIG. 1 to insert pictures in any suitable videos in the group of videos.