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Indexing User Uploaded Videos For Late Arriving Reference Content

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INDEXING USER UPLOADED VIDEOS FOR LATE ARRIVING REFERENCE CONTENT

ABSTRACT

Disclosed herein is a mechanism for indexing user uploaded videos. This mechanism can be used, for example, to detect unauthorized media content items in instances where the reference content is uploaded or otherwise received after the receipt of user uploaded video content. More particularly, the mechanism can create a video index of user uploaded video content or a subset of user uploaded video content that has met one or more criterion (e.g., a video that has been viewed at least a predetermined number of times) and a reference index of reference content including references files that have been activated subsequent to receiving corresponding user uploaded video content. Accordingly, activated reference content can be compared against the video index and user uploaded video content can be compared against the reference index to determine whether there is matching content.

BACKGROUND

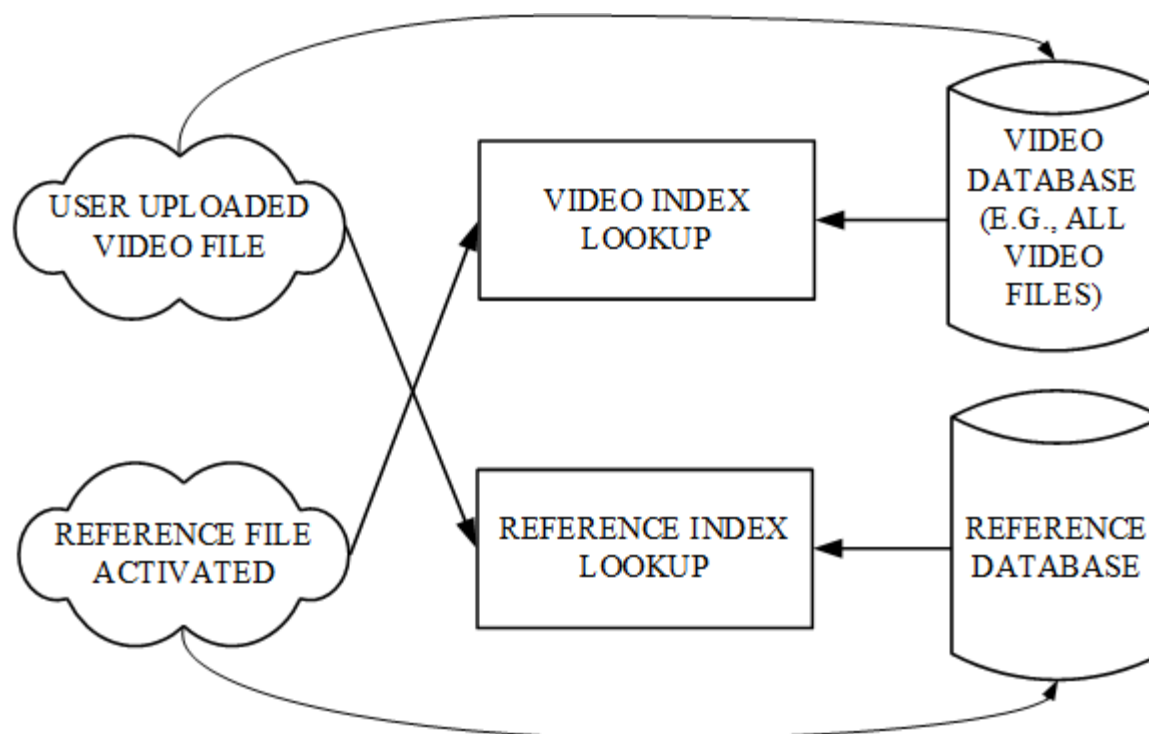
Video content providers can receive uploaded video content, store the uploaded video content, and then provide the uploaded video content to many users, for example, by streaming the video content to multiple user devices. These video content providers may determine whether the uploaded video content matches video content in a reference database, for example, that includes reference files of copyrighted content. However, it is often difficult to determine whether uploaded video content matches a reference file of copyrighted content. This may be because the reference file of copyrighted content was provided or uploaded to the reference database at a time later than receiving the uploaded video content.

In previous approaches, a batch system scanned uploaded video content against video content in a reference database that was provided or uploaded prior to the video content being uploaded. The batch system or a separate re-scanning system can, in some instances, compare previously uploaded video content against a reference index that includes new reference files.

DESCRIPTION

A video content provider (e.g., a video hosting or streaming service) can use the mechanisms to analyze received video content. The received video content can include, for example, user uploaded video content, reference files provided by content providers or partners against which the uploaded content can be matched, etc. The video content provider can use the mechanism to, for example, detect unauthorized media content items in instances where the reference content is uploaded or otherwise received after the receipt of user uploaded video content.

More particularly, as shown in FIGS. 1 and 2, the mechanism can create a video index of user uploaded video content or a subset of user uploaded video content that has met one or more criterion (e.g., a video that has been viewed at least a predetermined number of times) and a reference index of reference content including references files that have been activated subsequent to receiving corresponding user uploaded video content. Accordingly, activated reference content can be compared against the video index and user uploaded video content can be compared against the reference index to determine whether there is matching content.

**FIG. 1**

As shown in FIG. 1, in response to detecting that a video has been uploaded, the video can be stored in a video index of media content. In some instances, a fingerprint of the uploaded video can be generated and stored in a video index of fingerprints. Using a reference index lookup, the uploaded video can be compared against a reference index or any other suitable database of reference files. In some instances, a fingerprint generated from the uploaded video can be compared against fingerprints associated with reference files in a reference database to determine whether a match exists.

As also shown in FIG. 1, additionally to performing a reference index lookup, a reference video or reference file can be activated. In response to detecting that a reference video has been activated, the reference video can be stored or otherwise added to the reference index. For example, a fingerprint of the reference file can be generated and stored in the reference index. Using an uploaded video index lookup, the reference file can be compared against a video index

or any other suitable database of video files. In some instances, a fingerprint generated from the activated reference file can be compared against fingerprints associated with video files in a video database to determine whether a match exists.

Accordingly, if the uploaded video is received by a video server before the corresponding reference file is received by the video server, the uploaded video is indexed first and a match is detected in response to activating the reference file. Additionally, if the reference file is received by the video server, the reference file is stored and/or indexed in the reference index and a match is detected in response to uploading a corresponding video file.

Additionally or alternatively, in some instances, the video server can build an index of user uploaded videos in response to one or more criteria being met. For example, as shown in FIG. 2 below, instead of comparing an activated reference file against each of the videos in the video index, the video server can compare an activated reference file against a subset of the videos stored in the video index.

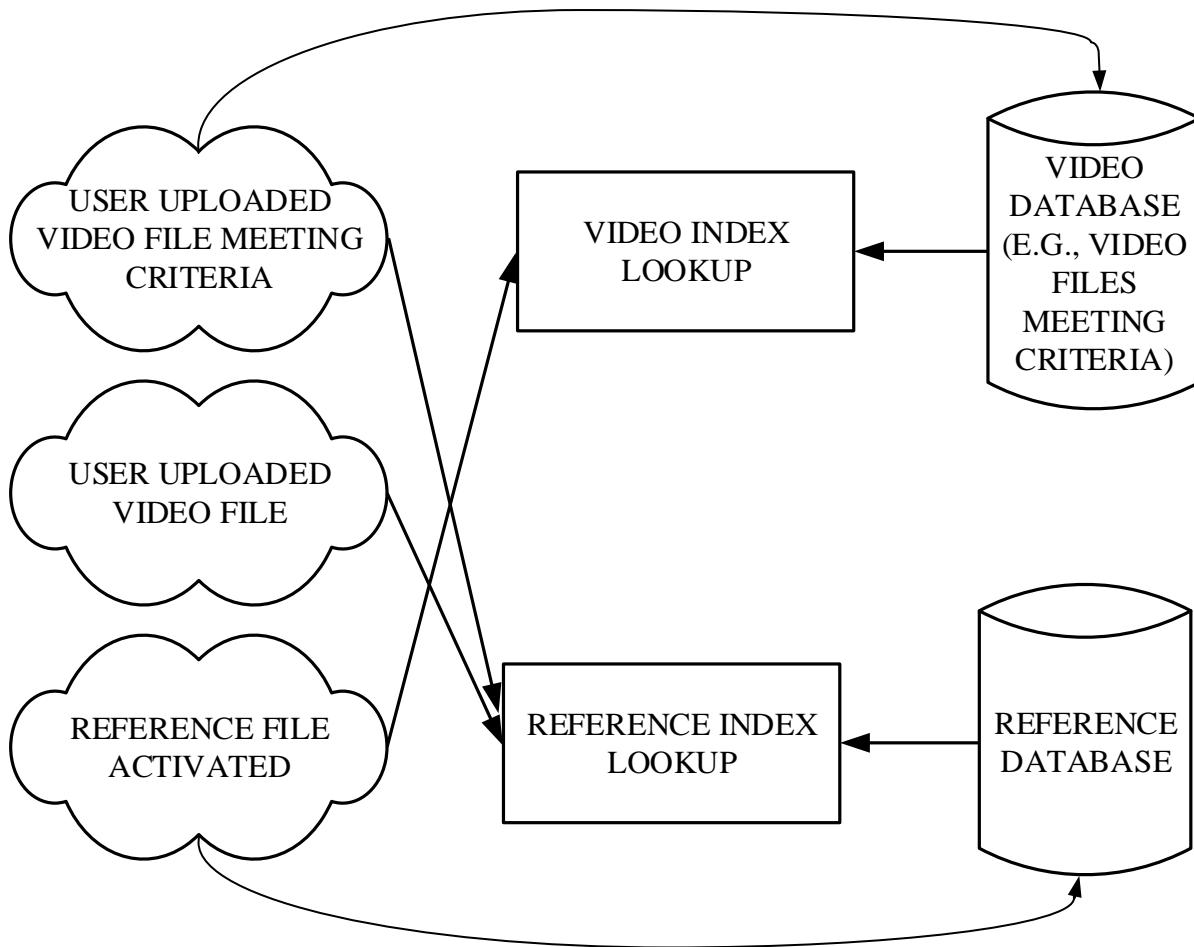


FIG. 2

As shown in FIG. 2, in response to detecting that a video has been uploaded, the uploaded video can be compared against a reference index or any other suitable database of reference files. In some instances, a fingerprint generated from the uploaded video can be compared against fingerprints associated with reference files in a reference database to determine whether a match exists.

As also shown in FIG. 2, in response to detecting that a video has met one or more criteria, the uploaded video can be stored in a video index of media content. The one or more criteria can include any suitable property of a video, such as having reached a particular number of views (e.g., 100 views, 500 views, 1,000 views, 1,500 views, etc.) or having reached a

particular number of positive indications (e.g., using a thumbs up indicator). In some instances, a fingerprint of the uploaded video meeting the one or more criteria can be generated and stored in a video index of fingerprints.

Additionally, the uploaded video meeting the one or more criteria (e.g., a video having reached 1,000 views) can be compared against a reference index or any other suitable database of reference files. In some instances, a fingerprint generated from the uploaded video that met the one or more criteria can be compared against fingerprints associated with reference files in a reference database to determine whether a match exists. In this scenario, each video can be compared against the reference index using a reference index lookup twice – i.e., a first instance when the video file has been uploaded and a second instance when the video file meets one or more criteria (e.g., 1,000 views).

It should be noted that, in the second instance in which the video file has met one or more criterion, the video file can be compared against a portion of the reference index. The portion of the reference index can be determined based on reference files that have been added and/or modified after the video file (e.g., a video file of user-generated content) was uploaded.

It should also be noted that, as the video index contains a subset of videos having met one or more criterion (e.g., videos having more than 100 views), an activated reference file can be compared against that subset of videos in the video index.

Accordingly, if the uploaded video is received by a video server before the corresponding reference file is received by the video server, an uploaded video that has met one or more criterion (e.g., reaching a particular number of views) is indexed and a match is detected in response to activating the reference file. Additionally, if the reference file is received by the video server, the reference file is stored and/or indexed in the reference index and a match is

detected in response to uploading a corresponding video file and/or in response to a video file meeting one or more criterion (e.g., reaching a particular number of views).

It should be noted that, in response to detecting a match between an uploaded video file and a reference file, an indication of the match can be presented on a user device. For example, a notification that provides an indication of the match can be presented to a user that uploaded the video file. In another example, a notification that provides an indication of the match can be presented to a user that uploaded the reference file. In yet another example, a notification that provides an indication of the match can be presented to a user of a video content provider server that provides video content to be consumed.

Accordingly, a mechanism for indexing user uploaded videos for late arriving reference content is provided.