Claims

1. A method for determining a duplicate video, comprising:

acquiring multiple types of video features of a query video;

according to the multiple types of video features of the query video, sequentially comparing a plurality of existing videos respectively to obtain a sequence comparison result;

performing a first ranking on the plurality of existing videos according to the sequence comparison result, and taking first n existing videos as first candidate videos according to a result of the first ranking, where n is a positive integer; and

determining a duplication level of the query video according to the sequence comparison result of the first candidate videos;

wherein the process of acquiring multiple types of video features of a query video comprises:

extracting frames of the query video to obtain a plurality of frame images of the query video;

extracting multiple types of image features of each of the plurality of frame images as first image features; and

according to each of the first image features with an identical type of the plurality of frame images of the query video, determining each video feature of the query video as a first video feature to obtain multiple types of first video features;

wherein the process of according to the multiple types of video features of the query video, sequentially comparing a plurality of existing videos respectively to obtain a sequence comparison result comprises:

acquiring multiple types of video features of one of the plurality of existing videos as second video features, wherein each of the second video features comprises a plurality of second image features;

determining a unit similarity between each of the second image features and each of the first image features of the same type respectively to obtain multiple types of unit similarities;

determining a minimum value or an average value of the multiple types of unit similarities, and determining a similarity matrix of the plurality of existing videos according to the minimum value or the average value of the multiple types of unit similarities; and

determining a sequence comparison score according to the similarity matrix, wherein the sequence comparison score is configured for indicating a similarity of the plurality of existing videos and the query video;

wherein determining the sequence comparison score according to the similarity matrix comprises:

defining a plurality of straight lines with a slope of a preset slope set value in the similarity matrix as candidate straight lines, and determining a straight line similarity of the candidate straight lines according to each unit similarity contained in each candidate straight line, wherein the straight line similarity of a candidate straight line is set as an average value of unit similarities contained in the candidate straight line, or set as a sum value of unit similarities contained in the candidate straight line;

determining a candidate straight line that enables a straight line to have a maximum similarity from the plurality of candidate straight lines, and defining the determined candidate straight line as a first matching straight line; and

determining the straight line similarity of the first matching straight line as the sequence comparison score.

2. The method of claim 1, wherein the process of extracting multiple types of image features of each of the plurality of frame images comprises:

for each of the plurality of frame images, acquiring one or more shift vectors, determining an end point pointed by the shift vector by using each of the one or more shift vectors and taking any pixel in each of the plurality of frame images as a starting point; and

determining the multiple types of image features of the plurality of frame images as a fence feature according to an overall condition of differences between each starting point and each corresponding end point.

3. The method of claim 1, wherein the process of extracting multiple types of image features of each of the plurality of frame images comprises:

for each of the plurality of frame images, performing multiple types of pooling processes step by step to obtain the multiple types of image features of the plurality of frame images as a pooling feature, wherein the multiple types of pooling processes comprise a maximum pooling process, a minimum pooling process and an average pooling process.

4. The method of claim 1, wherein the process of according to the multiple types of video features of the query video, sequentially comparing a plurality of existing videos respectively to obtain a sequence comparison result further comprises:

determining a duplicate video segment of the plurality of existing videos and the query video according to the similarity matrix.

5. The method of claim 1, wherein the process of according to the multiple types of video features of the query video, sequentially

comparing a plurality of existing videos respectively to obtain a sequence comparison result comprises:

performing a second ranking on the plurality of existing videos according to each of the first image features in at least one of the multiple types of first video features, according to a result of the second ranking, taking first k of the plurality of existing videos as second candidate videos, where k is a positive integer; and

performing a sequence comparison on each of the second candidate videos respectively to obtain the sequence comparison result.

6. The method of claim 5, wherein the process of performing a second ranking on the plurality of existing videos according to each of the first image features in at least one of the multiple types of first video features comprises:

using each of the first image features in at least one of the multiple types of first video features as an index request to perform a term frequency-inverse document frequency ranking on the plurality of existing videos.

7. The method of claim 5, wherein the process of according to each of the first image features with an identical type of the plurality of frame images of the query video, determining each video feature of the query video as a first video feature comprises:

binarizing the first image features; and

determining the first video feature according to binarized first image features of the plurality of frame images.

8. A device for determining a duplicate video, comprising:

a video feature acquisition module configured to acquire multiple types of video features of a query video;

a sequence comparison module configured to sequentially compare a plurality of existing videos respectively, according to the multiple types

of video features of the query video, to obtain a sequence comparison result;

a first ranking module configured to perform a first ranking on the plurality of existing videos according to the sequence comparison result, and take first n existing videos as first candidate videos according to a result of the first ranking, wherein n is a positive integer; and

a duplicate checking module configured to determine a duplication level of the query video according to the sequence comparison result of the first candidate videos;

wherein the video feature acquisition module further comprises:

a sampling unit configured to extract frames of the query video to obtain a plurality of frame images of the query video;

a first image feature extraction unit configured to extract multiple types of image features of each of the plurality of frame images as first image features; and

a first video feature determining unit configured to determining each video feature of the query video as a first video feature, according to each of the first image features with an identical type of the plurality of frame images of the query video, to obtain multiple types of first video features;

wherein the sequence comparison module further comprises:

a second video feature acquisition unit configured to acquire multiple types of video features of one of the plurality of existing videos as second video features, wherein each of the second video features comprises a plurality of second image features;

a unit similarity determining unit configured to determine a unit similarity between each of the second image features and each of the first image features of the same type respectively to obtain multiple types of unit similarities;

a similarity matrix determining unit configured to determine a minimum value or an average value of the multiple types of unit similarities, and to determine a similarity matrix of the plurality of existing videos according to the minimum value or the average value of the multiple types of unit similarities; and

a sequence comparison unit configured to determine a sequence comparison score according to the similarity matrix, wherein the sequence comparison score is configured for indicating a similarity of the plurality of existing videos and the query video;

wherein determining the sequence comparison score according to the similarity matrix comprises:

defining a plurality of straight lines with a slope of a preset slope set value in the similarity matrix as candidate straight lines, and determining a straight line similarity of the candidate straight lines according to each unit similarity contained in each candidate straight line, wherein the straight line similarity of a candidate straight line is set as an average value of unit similarities contained in the candidate straight line, or set as a sum value of unit similarities contained in the candidate straight line;

determining a candidate straight line that enables a straight line to have a maximum similarity from the plurality of candidate straight lines, and defining the determined candidate straight line as a first matching straight line; and

determining the straight line similarity of the first matching straight line as the sequence comparison score.

9. The device of claim 8, wherein the first image feature extraction unit further comprises:

a sub-unit configured to, for each of the plurality of frame images, acquire one or more shift vectors, determine an end point pointed by the

shift vector by using each of the one or more shift vectors, take any pixel in each of the plurality of frame images as a starting point, and determine the multiple types of image features of the plurality of frame images as a fence feature according to an overall condition of differences between each starting point and each corresponding end point.

10. The device of claim 8, wherein the first image feature extraction unit further comprises:

a sub-unit configured to, for each of the plurality of frame images, perform multiple types of pooling processes step by step to obtain the multiple types of image features of the plurality of frame images as a pooling feature, wherein the multiple types of pooling processes comprise a maximum pooling process, a minimum pooling process and an average pooling process.

11. The device of claim 8, wherein the process of according to the multiple types of video features of the query video, sequentially comparing a plurality of existing videos respectively to obtain a sequence comparison result further comprises:

a sub-unit configured to determine a duplicate video segment of the plurality of existing videos and the query video according to the similarity matrix.

12. The device of claim 8, further comprising:

a second ranking module, prior to the sequence comparison module, configured to perform a second ranking on the plurality of existing videos according to each of the first image features in at least one of the multiple types of first video features, to take first k of the plurality of existing videos as second candidate videos, according to a result of the second ranking, where k is a positive integer, and to perform a sequence comparison on each of the second candidate videos respectively to obtain the sequence comparison result.

13. A hardware device for determining duplicate video, comprising: and

a memory, configured to store non-transitory computer-readable instructions;

a processor, configured to perform the method for determining duplicate video according to any of claims 1 to 7 when the computer-readable instructions are executed by the processor.

14. A computer-readable storage medium, storing non-transitory computer-readable instructions to perform the method for determining duplicate video according to any of claims 1 to 7 when the non-transitory computer-readable instructions are executed by a computer.