CLAIMS

What is claimed is:

1. A blockchain-based infringement evidence storage method, comprising:

retrieving a candidate video similar to a target video from a video database based on a plurality of feature vectors of the target video;

constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video;

using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity; and

uploading infringement evidence comprising an abstract of the target video, the video segment matching the target video in the candidate video, and the corresponding similarity to a blockchain when the similarity corresponding to the video segment matching the target video in the candidate video is greater than or equal to a predetermined similarity threshold, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

2. A video matching method, comprising:

obtaining a plurality of feature vectors of a target video;

retrieving a candidate video similar to the target video from a video database based on the plurality of feature vectors of the target video;

constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and the

plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video; and

using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

3. The method according to claim 2, wherein the retrieving a candidate video similar to the target video from a video database based on a plurality of feature vectors of the target video comprises:

obtaining a feature vector retrieval result similar to the plurality of feature vectors of the target video from the video database; and

obtaining the candidate video similar to the target video from the video database based on the feature vector retrieval result similar to the plurality of feature vectors of the target video.

4. The method according to claim 3, wherein the constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video comprises:

constructing the similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video based on a vector retrieval result between the plurality of feature vectors of the target video and a plurality of feature vectors of each of the candidate video; and

drawing the similarity matrix between the plurality of feature vectors of the target video and the plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video, to obtain the time domain similarity matrix feature map between the target video and the candidate video.

5. The method according to claim 4, wherein when there are a plurality of candidate videos, the drawing the similarity matrix between the plurality of feature

vectors of the target video and a plurality of feature vectors of each of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video, to obtain the time domain similarity matrix feature map between the target video and the candidate video comprises:

drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of each of a plurality of candidate videos on each of a plurality of two-dimensional feature maps based on a time domain mapping relationship between the target video and the plurality of candidate videos, to obtain a plurality of time domain similarity matrix feature maps between the target video and the plurality of candidate videos; and

splicing the plurality of time domain similarity matrix feature maps between the target video and the plurality of candidate videos, to obtain a time domain similarity matrix feature map between the target video and the plurality of candidate videos.

6. The method according to claim 2 or 5, wherein the using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity comprises:

using the time domain similarity matrix feature map as the input into the deep learning detection model, to output an interval range of the video segment matching the target video in the candidate video in a time domain dimension and a similarity between the target video and the matched video segment.

7. The method according to claim 2, wherein the deep learning detection model comprises at least one of the following: a faster convolution neural network based candidate region detection model Faster R-CNN, a masked convolutional neural network based candidate region detection model mask R-CNN, a real-time object detection model YOLO, and a single multi-box detection model SSD.

8. A blockchain-based infringement evidence storage apparatus, comprising:

a candidate video retrieval module, configured to retrieve a candidate video similar to a target video from a video database based on a plurality of feature vectors of the target video;

a feature map construction module, configured to construct a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the

candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video;

a model output module, configured to use the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity; and

an evidence uploading module, configured to upload infringement evidence comprising an abstract of the target video, the video segment matching the target video in the candidate video, and the corresponding similarity to a blockchain when the similarity corresponding to the video segment matching the target video in the candidate video is greater than or equal to a predetermined similarity threshold, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

9. A video matching apparatus, comprising:

a feature vector acquisition module, configured to obtain a plurality of feature vectors of a target video;

a candidate video retrieval module, configured to retrieve a candidate video similar to the target video from a video database based on the plurality of feature vectors of the target video;

a feature map construction module, configured to construct a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video; and

a model output module, configured to use the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video

corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

10. An electronic device, comprising:

a processor; and

a storage, configured to store a computer-executable instruction, wherein when the computer-executable instruction is executed, the processor is enabled to perform the following operations:

retrieving a candidate video similar to a target video from a video database based on a plurality of feature vectors of the target video;

constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video;

using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity; and

uploading infringement evidence comprising an abstract of the target video, the video segment matching the target video in the candidate video, and the corresponding similarity to a blockchain when the similarity corresponding to the video segment matching the target video in the candidate video is greater than or equal to a predetermined similarity threshold, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

11. A computer-readable storage medium, wherein the computer-readable storage medium stores one or more programs, and when the one or more programs are executed by an electronic device comprising a plurality of application programs, the electronic device is enabled to perform the following operations:

retrieving a candidate video similar to a target video from a video database based on a plurality of feature vectors of the target video;

constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video;

using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity; and

uploading infringement evidence comprising an abstract of the target video, the video segment matching the target video in the candidate video, and the corresponding similarity to a blockchain when the similarity corresponding to the video segment matching the target video in the candidate video is greater than or equal to a predetermined similarity threshold, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

12. An electronic device, comprising:

a processor; and

a storage, configured to store a computer-executable instruction, wherein when the computer-executable instruction is executed, the processor is enabled to perform the following operations:

obtaining a plurality of feature vectors of a target video;

retrieving a candidate video similar to the target video from a video database based on the plurality of feature vectors of the target video;

constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video on a two-dimensional feature map

based on a time domain mapping relationship between the target video and the candidate video; and

using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.

13. A computer-readable storage medium, wherein the computer-readable storage medium stores one or more programs, and when the one or more programs are executed by an electronic device comprising a plurality of application programs, the electronic device is enabled to perform the following operations:

obtaining a plurality of feature vectors of a target video;

retrieving a candidate video similar to the target video from a video database based on the plurality of feature vectors of the target video;

constructing a time domain similarity matrix feature map between the target video and the candidate video based on the target video and the candidate video by drawing a similarity matrix between the plurality of feature vectors of the target video and a plurality of feature vectors of the candidate video on a two-dimensional feature map based on a time domain mapping relationship between the target video and the candidate video; and

using the time domain similarity matrix feature map as an input into a deep learning detection model, to output a video segment matching the target video in the candidate video and a corresponding similarity, wherein

the deep learning detection model is obtained through training based on time domain similarity matrix feature maps of a plurality of groups of sample videos and corresponding labels, the sample video comprises a query video and a candidate video corresponding to the query video, and the label corresponding to the sample video comprises a video segment matching the query video in the sample video in the corresponding candidate video and an infringement flag.