

CLAIMS

1. A living body detection method, comprising:

determining multiple target face images from an acquired to-be-detected video based on similarities between multiple face images included in the to-be-detected video; and

determining a living body detection result for the to-be-detected video based on the multiple target face images.

2. The living body detection method according to claim 1, wherein a similarity between every adjacent two in the multiple target face images is lower than a first value, and/or,

extracting the multiple target face images from the acquired to-be-detected video comprises:

determining a first target face image in the multiple target face images from the to-be-detected video;

determining a second target face image from multiple consecutive face images of the to-be-detected video based on the first target face image, wherein a similarity between the second target face image and the first target face image satisfies a preset similarity requirement.

3. The living body detection method according to claim 2, further comprising:

dividing the to-be-detected video into multiple segments, wherein each of the multiple segments comprises a certain number of consecutive face images;

determining the first target face image in the multiple target face images from the to-be-detected video comprises:

selecting the first target face image from a first segment of the multiple segments;

determining the second target face image from the multiple consecutive face images of the to-be-detected video based on the first target face image comprises:

determining the second target face image from all the multiple segments based on the first target face image.

4. The living body detection method according to claim 3, wherein determining the second target face image from all the multiple segments comprises:

comparing similarities of each face image in the first segment with respect to the first target face image to determine a face image with a smallest similarity as the second target face image for the first segment;

for each of other segments than the first segment in the multiple segments,

comparing similarities of each face image in the segment with respect to the second target face image for a previous segment of the segment to determine a face image with a smallest similarity as the second target face image for the segment.

5. The living body detection method according to any one of claims 1-4, wherein the similarities between the multiple face images is obtained by:

selecting two face images from the multiple face images as a first face image and a second face image;

based on respective pixel values of pixel points in the first face image and respective pixel values of pixel points in the second face image, obtaining a differential face image between the first face image and the second face image;

according to respective pixel values of pixel points in the differential face image, obtaining a variance corresponding to the differential face image; and

taking the variance as a similarity between the first face image and the second face image.

6. The living body detection method according to any one of claims 1-5, wherein

before extracting the multiple target face images from the acquired to-be-detected video, the method further comprises:

acquiring key point information of each in the multiple face images included in the to-be-detected video;

obtaining multiple aligned face images by performing alignment on the multiple face images based on the key point information of each in the multiple face images; and

determining the multiple target face images from the acquired to-be-detected video based on the similarities between the multiple face images included in the to-be-detected video comprises:

determining the multiple target face images from the multiple aligned face images based on the similarities between the multiple aligned face images, and/or,

determining a living body detection result for the to-be-detected video based on the multiple target face images comprises:

obtaining a first detection result based on a feature extraction result of each in the multiple target face images, and/or a second detection result based on differential images between every adjacent two in the multiple target face images;

determining a living body detection result for the to-be-detected video based on the first detection result and/or the second detection result.

7. The living body detection method according to claim 6, wherein obtaining the first detection result based on feature data of each in the multiple target face images comprises:

obtaining a first fusion feature data by performing feature fusion on respective feature extraction results of the multiple target face images; and

obtaining the first detection result based on the first fusion feature data, and/or,

obtaining a second detection result based on differential images between every adjacent two in the multiple target face images, comprises:

performing concatenating process on differential images between every adjacent two in the multiple target face images to obtain a differential concatenated image; and

obtaining the second detection result based on the differential concatenated image, and/or,

determining a living body detection result for the to-be-detected video based on the first detection result and the second detection result comprises:

obtaining the living body detection result by calculating a weighted sum of the first detection result and the second detection result.

8. The living body detection method according to claim 7, wherein

the respective feature extraction results of the target face images comprises:

respective first intermediate feature data obtained by performing multiple stages of first feature extraction on each of the target face images; and

obtaining the first fusion feature data by performing feature fusion on the respective feature extraction results of the multiple target face images, comprises:

for each stage of first feature extraction, performing fusion on the respective first intermediate feature data of the multiple target face images in this stage of first feature

extraction, so as to obtain intermediate fusion data for this stage of first feature extraction; and

obtaining the first fusion feature data based on respective intermediate fusion data for the multiple stages of first feature extraction, and/or,

obtaining the second detection result based on the differential concatenated image comprises:

obtaining a feature extraction result of the differential concatenated image by performing feature extraction on the differential concatenated image;

obtaining second fusion feature data by performing feature fusion on the feature extraction result of the differential concatenated image; and

obtaining the second detection result based on the second fusion feature data.

9. The living body detection method according to claim 8, wherein performing fusion on the respective first intermediate feature data of the multiple target face images in the stage of first feature extraction, so as to obtain intermediate fusion data for this stage of first feature extraction, comprises:

obtaining a feature sequence for this stage of first feature extraction based on the respective first intermediate feature data of the multiple target face images in this stage of first feature extraction; and

inputting the feature sequence to a recurrent neural network for fusion, so as to obtain the intermediate fusion data for this stage of first feature extraction, and/or,

obtaining the first fusion feature data based on the respective intermediate fusion data for the multiple stages of first feature extraction, comprises:

obtaining the first fusion feature data by splicing the respective intermediate fusion data for the multiple stages of first feature extraction and performing full connection on the spliced intermediate fusion data.

10. The living body detection method according to claim 9, wherein

prior to obtaining a feature sequence for this stage of first feature extraction based on the respective first intermediate feature data of the multiple target face images in this stage of first feature extraction, the method further comprises:

performing global average pooling process on the respective first intermediate feature data of the multiple target face images in this stage of first feature extraction, so as

to obtain respective second intermediate feature data of the multiple target face images in this stage of first feature extraction; and

obtaining a feature sequence for this stage of first feature extraction based on the respective first intermediate feature data of the multiple target face images in this stage of first feature extraction comprises:

obtaining the feature sequence by arranging the respective second intermediate feature data of the multiple target face images in this stage of first feature extraction according to a time order of the multiple target face images.

11. The living body detection method according to any one of claims 6 to 10, wherein the feature extraction result of each target face image is obtained by:

performing multiple stages of feature extraction on the target face image, so as to obtain respective first initial feature data for each in the multiple stages of first feature extraction; and

for each stage of first feature extraction, performing fusion on the first initial feature data for this stage of first feature extraction and the first initial feature data for at least one stage of first feature extraction subsequent to this stage of first feature extraction, so as to obtain the first intermediate feature data for this stage of first feature extraction, wherein the feature extraction result of the target face image comprises the respective first intermediate feature data for each in the multiple stages of first feature extraction.

12. The living body detection method according to claim 11, wherein performing fusion on the first initial feature data for this stage of first feature extraction and the first initial feature data for at least one stage of first feature extraction subsequent to this stage of first feature extraction, so as to obtain the first intermediate feature data for this stage of first feature extraction, comprises:

performing fusion on the first initial feature data for this stage of first feature extraction and the first intermediate feature data for a stage of first feature extraction subsequent to this stage of first feature extraction, so as to obtain the first intermediate feature data for this stage of first feature extraction, wherein the first intermediate feature data for the subsequent stage of first feature extraction is obtained based on the first initial feature data for the subsequent stage of first feature extraction.

13. The living body detection method according to claim 12, wherein performing fusion on the first initial feature data for this stage of first feature extraction and the first intermediate feature data for a stage of first feature extraction subsequent to this stage of first feature extraction, so as to obtain the first intermediate feature data for this stage of first feature extraction comprises:

up-sampling the first intermediate feature data for a stage of first feature extraction subsequent to this stage of first feature extraction, so as to obtain up-sampled data for this stage of first feature extraction; and

fusing the up-sampled data and the first initial feature data for this stage of first feature extraction, so as to obtain first intermediate feature data for this stage of first feature extraction.

14. The living body detection method according to claim 8, wherein obtaining a feature extraction result of the differential concatenated image by performing feature extraction on the differential concatenated image comprises:

performing multiple stages of second feature extraction on the differential concatenated image, so as to obtain respective second initial feature data for each stage of second feature extraction; and

obtaining the feature extraction result of the differential concatenated image based on the respective second initial feature data for the multiple stages of second feature extraction, and/or,

obtaining the feature extraction result of the differential concatenated image based on the respective second initial feature data for the multiple stages of second feature extraction, comprises:

for each stage of second feature extraction, performing fusion on the second initial feature data for this stage of second feature extraction and the second initial feature data for at least one stage of second feature extraction prior to this stage of second feature extraction, so as to obtain third intermediate feature data for this stage of second feature extraction,

wherein the feature extraction result of the differential concatenated image includes the respective third intermediate feature data for the multiple stages of second feature extraction.

15. The living body detection method according to claim 14, wherein performing fusion on the second initial feature data for this stage of second feature extraction and the second initial feature data for at least one stage of second feature extraction prior to this stage of second feature extraction, so as to obtain third intermediate feature data for this stage of second feature extraction, comprises:

down-sampling the second initial feature data for a stage of second feature extraction prior to this stage of second feature extraction, to obtain down-sampled data for this stage of second feature extraction; and

performing fusion on the down-sampled data for this stage of second feature extraction and the second initial feature data for this stage of second feature extraction, to obtain the third intermediate feature data for this stage of second feature extraction, and/or,

before obtaining the second fusion feature data by performing feature fusion on the feature extraction result of the differential concatenated image, the method further comprises:

performing global average pooling process on respective third intermediate feature data of the differential concatenated image for each in the multiple stages of second feature extraction, so as to obtain respective fourth intermediate feature data of the differential concatenated image for the multiple stages of second feature extraction; and

obtaining the second fusion feature data by performing feature fusion on the feature extraction result of the differential concatenated image comprises:

obtaining the second fusion feature data by performing feature fusion on the respective fourth intermediate feature data of the differential concatenated image for the multiple stages of second feature extraction.

16. The living body detection method according to claim 15, wherein obtaining the second fusion feature data by performing feature fusion on the respective fourth intermediate feature data of the differential concatenated image for the multiple stages of second feature extraction comprises:

obtaining the second fusion feature data by splicing the respective fourth intermediate feature data for the multiple stages of second feature extraction and performing full connection on the spliced fourth intermediate feature data.

17. A living body detection apparatus, comprising:

an acquisition unit configured to determine multiple target face images from an acquired to-be-detected video based on similarities between multiple face images included in the to-be-detected video; and

a detection unit configured to determine a living body detection result for the to-be-detected video based on the multiple target face images.

18. An electronic device, comprising:

a processor, and

a memory storing machine-readable instructions executable by the processor,

wherein, when the machine-readable instructions are executed by the processor, the processor performs the living body detection method according to any one of claims 1 to 16.

19. A computer-readable storage medium having a computer program stored on thereon, when the computer program is run by an electronic device, the computer program causes the electronic device to perform the living body detection method according to any one of claims 1 to 16.

20. A computer program product comprising machine-executable instructions, wherein, when the machine-executable instructions are read and executed by an electronic device, the instructions cause the electronic device to perform the living body detection method according to any one of claims 1 to 16.