

S2: if there is no image in the infrared light image, it is determined that the object to be identified is non-living, otherwise, executing step S3;

S3: extracting the features of the eyes and face of the object to be identified in the visible light image and the infrared light image, and determining whether the object to
5 be identified is living or not based on the extracted features.

The inventor also found that for photo attacks, the light source of the scene where the photo was taken would be a point source or a parallel source, there is only one feature. But there will be obvious traces of point light (such as the tip of the nose reflecting light because of closer to the screen, cheeks being dim, etc.) in the face of a
10 real person under the infrared fill light irradiation, while there will be none of those features in the visible light image. In this way, the rest of the photos, and hole attacks can be prevented, and it almost does not affect the pass rate of real people. The achievement of these classification uses advanced deep learning technologies at home and abroad. Combined with our years of practical experience in the visual industry,
15 eventually we get classifiers with good performance, fast speed, and small size. In addition, for the scene without exposing the real human eye (such as photo attack and 3d mask attack), the eyes of a real human under infrared light will have the features of pupil reflecting light, and the white part of the eye being gray, etc., and the pupils in the visible light will not have these features. Using the different features of the eyes in the
20 visible and infrared light, the anti-attack capability can be further enhanced.

Step S3 specifically includes the steps of:

S31: determining whether there is a face in both of the visible light image and the infrared light image, if yes, executing step S32; or if no, executing step S31;

S32: extracting the features of the face and eyes of the object to be identified in the
25 visible light image and the infrared light image.

S34: If the nose reflects light and cheeks are dim, the pupils reflect light and the white part of the eye is gray in the infrared light image, while there is no above feature in the visible light image, it is determined that the object to be identified is living, otherwise is non-living.

30 After being identified as living in step S3, executing the steps of:

S4: determining the distance between the object to be identified with the infrared camera and the visible camera respectively;

S5: determining the angle between the front of the object to be identified with the infrared camera and the visible camera respectively;

35 S6: determining whether the object to be identified captured by the infrared

CLAIMS

1. A living body detection method, wherein comprising:

S1: capturing an infrared light image of an object to be identified by an infrared camera, and capturing a visible light image of the object to be identified by a visible
5 light camera;

S2: if there is no image in the infrared light image, it is determined that the object to be identified is non-living, otherwise, executing step S3;

S3: extracting the features of the eyes and face of the object to be identified in the visible light image and the infrared light image, and determining whether the object to
10 be identified is living or not based on the extracted features.

2. The living body detection method of claim 1, wherein Step S3 specifically includes the steps of:

S31: determining whether there is a face in both of the visible light image and the
15 infrared light image, if yes, executing step S32; or if no, repeating step S31;

S32: extracting the features of the face of the object to be identified in the visible light image and the infrared light image; if the nose reflects light and the cheeks are dim in the infrared light image, perform S33;

S33: Extracting features of the eyes of the object to be identified in the visible light
20 image and the infrared light image; if the pupils reflect light and the white part of the eye is gray in the infrared light image, it is determined that the object to be identified is living, otherwise is non-living.

3. The living body detection method of claim 2, wherein after being identified as
25 living in step S3, executing the steps of:

S4: determining the distance between the object to be identified with the infrared camera and the visible camera respectively;

S5: determining the angle between the front of the object to be identified with the infrared camera and the visible camera respectively;

S6: determining whether the object to be identified captured by the infrared camera
30 and the visible light camera is the same thing according to the data obtained in steps S4 and S5 in combination with the positional and angular relationship between the infrared camera and the visible light camera, if yes, then the object to be identified being determined to be living, if not, the object to be identified being determined to be non-
35 living.

4. The living body detection method of claim 3, wherein The angle between the front of the object to be identified and the infrared camera is the angle between the front of the object to be identified and the front of the infrared camera; the angle between the front of the object to be identified and the infrared camera is the angle between the front of the object to be identified and the front of the visible light camera.

5. A device for implementing the method of any one of claims 1 to 4, wherein comprising:

10 a visible light camera, for capturing a visible light image of the object to be identified by a visible light camera;

an infrared camera, for capturing an infrared light image of an object to be identified by an infrared camera;

a computer, connected with the visible light camera and the infrared camera

15 respectively, for determining whether the object to be identified is living or not according to the visible light image and the infrared light image.

6. The device of claim 5, wherein the computer comprising:

a pre-recognition module, for determining whether it is non-living based on

20 whether there is an image in the infrared light image;

a feature identification module, connected with the pre-identification module, for extracting features of the eyes and face of the object to be identified in the visible light image and the infrared light image after passes the pre-identification module verification, and determining whether the object to be identified is living or not based

25 on the extracted features.

7. The device of claim 5, wherein the feature identification module comprising:

a first identification unit, for extracting the features of the face of the object to be identified in the visible light image and the infrared light image, if the nose reflects light

30 and cheeks are dim in the infrared light image, it is determined that the object to be identified is living, otherwise is non-living;

a second identification unit, for extracting features of the eyes of the object to be identified in the visible light image and the infrared light image, if the pupils reflect