CLAIMS

1. A liveness detection method, comprising:

sequentially displaying a plurality of images to a user;

capturing a plurality of face images of the user while displaying the plurality of images to the user;

for each of the captured face images:

determining an eye image of an eye of the user based on the face image,

extracting a to-be-verified image from the eye image of the user, wherein the to-be-verified image is a reflection of a corresponding one of the displayed images in the eye of the user, and

comparing the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the corresponding displayed image;

determining a quantity of matches between the to-be-verified images and the corresponding displayed images; and

performing liveness detection on the user based on the quantity of matches.

2. The method according to claim 1, wherein the determining the eye image of the user based on the face image comprises:

determining whether the face image contains the user's face or reaches a clarity; and

in response to determining that the face image contains the user's face or reaches the clarity, extracting the eye image of the user from the face image.

3. The method according to claim 1, wherein each displayed image comprises a first character, and each to-be-verified image comprises a second character; and

wherein the comparing the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the displayed image comprises:

comparing characteristic information in the corresponding displayed image and characteristic information in the to-be-verified image to determine whether the characteristic information in the to-be-verified image matches the characteristic information in the corresponding displayed image, wherein the characteristic information in the corresponding displayed image comprises a size of the first character, a color of the first character, or a location of the first character, and the characteristic information in the to-be-verified image comprises a size of the second character, a color of the second character, or a location of the second character.

4. The method according to claim 1, wherein each displayed image comprises a first

pattern, and each to-be-verified image comprises a second pattern; and

wherein the comparing the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the displayed image comprises:

comparing characteristic information in the corresponding displayed image and characteristic information in the to-be-verified image to determine whether the characteristic information in the to-be-verified image matches the characteristic information in the corresponding displayed image, wherein the characteristic information in the corresponding displayed image comprises a shape of the first pattern, a size of the first pattern, a color of the first pattern, or a location of the first pattern, and the characteristic information in the to-be-verified image comprises a shape of the second pattern, a size of the second pattern, a color of the second pattern, or a location of the second pattern.

5. The method according to claim 1, wherein the sequentially displaying the plurality of images to the user comprises:

sequentially displaying the plurality of images in a specified order within a time.

6. The method according to claim 5, wherein the capturing the plurality of face images of the user while displaying the plurality of images to the user comprises:

continuously capturing the plurality of face images of the user within the time.

7. A liveness detection apparatus, comprising:

a display module, configured to sequentially display a plurality of images to a user; and capture a plurality of face images of the user while displaying the plurality of images to the user;

a determination module, configured to, for each of the captured face images:

determine an eye image of an eye of the user based on the face image,

extract a to-be-verified image from the eye image of the user, wherein the to-be-verified image is a reflection of the corresponding displayed image in the eye of the user,

compare the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the corresponding displayed image, and

determine a quantity of matches between the to-be-verified images and the corresponding displayed images; and

a detection module, configured to perform liveness detection on the user based on the quantity of matches.

8. The apparatus according to claim 7, wherein when determining the eye image of the

user based on the face image, the determination module is configured to:

determine whether the face image contains the user's face or reaches a clarity; and

in response to determining that the face image contains the user's face or reaches the clarity, extract the eye image of the user from the face image.

9. The apparatus according to claim 7, wherein each displayed image comprises a first character, and each to-be-verified image comprises a second character; and

wherein when comparing the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the displayed image, the detection module is configured to:

compare characteristic information in the corresponding displayed image and characteristic information in the to-be-verified image to determine whether the characteristic information in the to-be-verified image matches the characteristic information in the corresponding displayed image, wherein the characteristic information in the corresponding displayed image comprises a size of the first character, a color of the first character, or a location of the first character, and the characteristic information in the to-be-verified image comprises a size of the second character, a color of the second character, or a location of the second character.

10. The apparatus according to claim 7, wherein each displayed image comprises a first pattern, and each to-be-verified image comprises a second pattern; and

wherein when comparing the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the displayed image, the detection module is configured to:

compare characteristic information in the corresponding displayed image and characteristic information in the to-be-verified image to determine whether the characteristic information in the to-be-verified image matches the characteristic information in the corresponding displayed image, wherein the characteristic information in the corresponding displayed image comprises a shape of the first pattern, a size of the first pattern, a color of the first pattern, or a location of the first pattern, and the characteristic information in the to-be-verified image comprises a shape of the second pattern, a size of the second pattern, a color of the second pattern, or a location of the second pattern.

11. The apparatus according to claim 7, wherein when sequentially displaying the plurality of images to the user, the display module is configured to:

sequentially display the plurality of images in a specified order within a time.

12. The apparatus according to claim 7, wherein when capturing the plurality of face

images of the user while displaying the plurality of images to the user,

the display module is configured to:

continuously capture the plurality of face images of the user within the time.

13. A liveness detection device, comprising one or more memories and processors, wherein the one or more memories storing a program configured to cause the one or more processors to execute the following steps:

sequentially displaying a plurality of images to a user;

capturing a plurality of face images of the user while displaying the plurality of images to the user;

for each of the captured face images:

determining an eye image of an eye of the user based on the face image,

extracting a to-be-verified image from the eye image of the user, wherein the to-be-verified image is a reflection of a corresponding one of the displayed images in the eye of the user, and

comparing the corresponding displayed image with the to-be-verified image to determine whether the to-be-verified image matches the corresponding displayed image;

determining a quantity of matches between the to-be-verified images and the corresponding displayed images; and

performing liveness detection on the user based on the quantity of matches.