CLAIMS

1. A facial expression-based unlocking method, executed by a terminal, the method comprising:

displaying an expression unlock page;

displaying an unlock node sequence on the expression unlock page, wherein the unlock node sequence corresponds to a string of passwords, and each of unlock nodes in the unlock node sequence is unlockable using a facial expression;

sequentially performing recognition on a facial expression in a facial image that is captured in real time for each unlock node in the unlock node sequence, in an order of the unlock nodes in the unlock node sequence;

creating an unlock status identification at the unlock node, wherein the unlock status identification indicates that unlock status of the unlock node changes from a state in which no unlocking operation has been performed to a state in which an unlocking operation has been performed; and

completing unlocking based on the unlock status identification and match between the facial expression in the facial image and a corresponding target expression;

wherein the method further comprises, in the unlocking the unlock node in the unlock node sequence, displaying, in an expression prompt area of the expression unlock page, a prompt image corresponding to the unlock node in response to an expression prompt operation triggered in the expression prompt area, wherein the prompt image does not reveal the facial expression.

2. The method according to claim 1, wherein the unlock node sequence is displayed in an unlock progress area of the expression unlock page; and the method further comprises:

displaying, in a face preview area of the expression unlock page, the facial image captured in real time.

3. The method according to claim 2, wherein the method further comprises:

generating an expression model map corresponding to the facial expression after each facial expression recognition is completed;

superimposing and displaying the expression model map on the facial image in the face preview area; and

in response to a determination that the expression model map is consistent with an expression

map of a corresponding unlock node, determining that the facial expression in the facial image matches the corresponding target expression.

4. The method according to claim 1, wherein each unlock node corresponds to at least two different target expressions; and the sequentially performing the recognition and creating the unlock status identification comprises:

performing facial expression recognition on at least two facial images corresponding to the unlock node; and

in response to a determination that facial expressions in the at least two facial images match the corresponding target expressions respectively, creating the unlock status identification at the unlock node.

5. The method according to any one of claims 2 to 4, wherein the sequentially performing the recognition comprises:

sequentially extracting eye feature points from the facial image corresponding to the respective unlock node in the unlock node sequence;

among the eye feature points, determining a first distance between an upper eyelid feature point and a lower eyelid feature point and determining a second distance between a left eye corner feature point and a right eye corner feature point; and

determining an eye portion posture according to a relationship between a ratio of the first distance to the second distance and at least one preset range.

6. The method according to any one of claims 2 to 4, wherein the sequentially performing the recognition comprises:

sequentially extracting lip feature points from the facial image corresponding to the respective unlock node in the unlock node sequence; and

among the lip feature points, determining a lip portion posture according to a height difference between a lip center feature point and a lip corner feature point; or,

among the lip feature points, determining a lip portion posture according to a third distance between an upper lip feature point and a lower lip feature point; or,

among the lip feature points, determining a lip portion posture according to a relationship between a ratio of the third distance to a fourth distance and at least one preset range, wherein the fourth distance is a distance between a left lip corner feature point and a right lip corner feature point.

7. The method according to claim 2, wherein the face preview area displays a face capture frame; and after displaying, in the face preview area of the expression unlock page, the facial image captured in real time, the method further comprises:

determining whether a facial key point in the facial image is located within the face capture frame;

in response to a determination that the facial key point is located within the face capture frame, performing the sequentially performing the recognition and creating the unlock status identification; and

in response to a determination that the facial key point is not located within the face capture frame, transmitting prompt information for adjusting a capture orientation.

8. The method according to claim 1, wherein the facial image is an image obtained by capturing a to-be-tested object; the method further comprises:

sequentially performing human face recognition on a facial image corresponding to each unlock node in an order of unlock nodes in the unlock node sequence, to obtain a human face recognition result; and

the completing the unlocking based on the unlock status identification and the match between the facial expression in the facial image and the corresponding target expression comprises:

in response to a determination that the unlock status identification is created at each unlock node, the facial expression in each facial image matches the corresponding target expression, and according to the human face recognition result, determining that the to-be-tested object is consistent with a target object, completing the unlocking.

9. The method according to claim 1, wherein the method further comprises:

in response to a determination that the unlock status identification is created at each unlock node in the unlock node sequence, but the facial expression in each facial image mismatches the corresponding target expression, transmitting prompt information of unlock failure; and

canceling displaying of the unlock status identification, and returning to the sequentially performing the recognition on the facial expression in the facial image that is captured in real time for each unlock node in the unlock node sequence.

10. The method according to claim 9, wherein the method further comprises:

in response to a determination that the unlocking fails, obtaining a cumulative quantity of unlock failures;

in response to a determination that the cumulative quantity reaches a preset quantity of times, suspending an unlocking process; and

obtaining a reserved communication number and transmitting alarm information to the reserved communication number.

11. The method according to any one of claims 1 to 10, wherein the method further comprises:

displaying an expression entry page;

sequentially entering, through the expression entry page, expression maps corresponding to expression identifications in the expression entry page;

entering an expression combination page; and

in response to an operation triggered on the expression combination page, combining the expression identifications to obtain an expression unlock sequence.

12. The method according to claim 2 or 3, wherein the facial image comprises a face and a hand; and the method further comprises:

in the facial expression recognition, performing gesture recognition on the hand in the facial image; and

the creating the unlock status identification at the respective unlock node in the unlock progress area after each facial expression recognition is completed comprises:

creating the unlock status identification at the respective unlock node in the unlock progress area after each facial expression recognition and gesture recognition are completed.

13. The method according to claim 4, wherein the method further comprises:

in response to a determination that the facial expressions in the at least two facial images match the corresponding target expressions respectively, determining an interval between capture times of the at least two facial images; or,

determining an interval between unlock times of the unlock node and a previous processed unlock node; and

in response to a determination that the interval between the capture times or the interval between the unlock times meets a corresponding time interval condition, performing the creating the unlock status identification at the unlock node.

14. The method according to any one of claims 2 to 4, wherein the sequentially performing the recognition comprises:

sequentially extracting an eyebrow feature point and an eyelid feature point from the facial image corresponding to each unlock node in the unlock node sequence;

determining a fifth distance between the eyebrow feature point and the eyelid feature point; and

determining an eyebrow posture according to a relationship between the fifth distance and a preset distance.

15. A facial expression-based unlocking apparatus, the apparatus comprising:

a display module, configured to display an expression unlock page;

a first displaying module, configured to display an unlock node sequence on the expression unlock page, wherein the unlock node sequence corresponds to a string of passwords, and each of unlock nodes in the unlock node sequence is unlockable using a facial expression;

a creation module, configured to sequentially perform recognition on a facial expression in a facial image that is captured in real time for each unlock node in the unlock node sequence, in an order of the unlock nodes in the unlock node sequence, and create an unlock status identification at the unlock node, wherein the unlock status identification indicates that unlock status of the unlock node changes from a state in which no unlocking operation has been performed to a state in which an unlocking operation has been performed; and

an unlocking module, configured to complete unlocking based on the unlock status identification and match between the facial expression in the facial image and a corresponding target expression;

the apparatus is further configured to, in the unlocking the unlock node in the unlock node sequence, display, in an expression prompt area of the expression unlock page, a prompt image corresponding to the unlock node in response to an expression prompt operation triggered in the expression prompt area, wherein the prompt image does not reveal the facial expression.

16. The apparatus according to claim 15, wherein the unlock node sequence is displayed in an unlock progress area of the expression unlock page; and the apparatus further comprises:

a second displaying module, configured to display, in a face preview area of the expression unlock page, the facial image captured in real time.

17. The apparatus according to claim 16, wherein the apparatus further comprises:

a generation module, configured to generate an expression model map corresponding to the facial expression after each facial expression recognition is completed;

a superimposing module, configured to superimpose and display the expression model map on the facial image in the face preview area; and

a determining module, configured to determine, in response to a determination that the expression model map is consistent with an expression map of a corresponding unlock node, that the facial expression in the facial image matches the corresponding target expression.

18. A computer device, comprising a memory and a processor, the memory storing a computer program, which when executed by the processor, causes the processor to perform the method according to any one of claims 1 to 14.

19. A computer-readable storage medium, storing a computer program, which when executed by a processor, causes the processor to perform the method according to any one of claims 1 to 14.