

determine that the authentication of the identity of the user is successful upon verifying that the gesture recognition information is consistent with the dynamic face authentication prompt information.

In the embodiments of the present application, when identity authentication is performed for a user, a server sends dynamic authentication prompt information to a terminal. The terminal obtains gesture recognition information of the dynamic human face authentication prompt information by recognizing a facial gesture that is presented by the user, and sends the gesture recognition information to the server. The server determines that the authentication of the identity of the user is successful upon verifying that the gesture recognition information is consistent with the dynamic human face authentication prompt information. Using the embodiments of the present application, authentication having a high security can be performed on a user identity using dynamic human face authentication. As compared with existing authentication methods that use an authentication password, authentication information will not be stolen by a malicious third party, thus improving the reliability of authentication. Moreover, a user may be recognized as a live user via dynamic human face authentication, thereby further improving the accuracy of identity authentication and reducing potential security risks during a process of authentication.

The invention is defined in the independent claims 1, 8 and 13.

Brief Description of the Drawings

FIG. 1 is a schematic diagram of an identity authentication scenario according to an embodiment of the present application.

FIG. 2A is a flowchart of an example identity authentication method according to the present application.

Claims

1. An identity authentication method, wherein the method comprises:
 - acquiring facial feature information of a user, the acquiring the facial feature information of the user comprising:
 - tracking (302) a face of the user upon detecting the face of the user;
 - acquiring (303) a face image according to a preset time interval when tracking the face;
 - determining (304) whether the face image meets a preset feature extraction condition; and
 - extracting (305) facial feature information of the user from the face image in response to the feature extraction condition being met;
 - using the facial feature information as first facial feature information of the user;
 - sending (308) the first facial feature information of the user to the server to allow the server to send the dynamic face authentication prompt information in response to verifying that the first facial feature information matches second facial feature information of the user that is stored;
 - receiving (201) the dynamic face authentication prompt information sent by a server during identity authentication of a user;
 - obtaining (202) gesture recognition information of the dynamic face authentication prompt information by recognizing a facial gesture presented by the user; and
 - sending (203) the gesture recognition information to the server to enable the server to confirm that the identity authentication is successful for the user upon verifying that the gesture recognition information is consistent with the dynamic face authentication prompt information.

2. The method of any preceding claim, wherein the method further comprises:
acquiring (303) facial feature information of the user when the user conducts registration, and using the facial feature information acquired during the registration as the second facial feature information of the user; and

sending (308) the second facial feature information to the server to enable the server to store (309) a correspondence relationship between a user name of the user and the second facial feature information.

3. The method of claim 1 or claim 2, wherein determining whether the face image meets the preset feature extraction condition comprises:

determining (304) whether a resolution of the face image meets a preset resolution threshold;

extracting (305) head gesture information from the face image if the resolution threshold is met, the head gesture information comprising at least one of the following angles: a head lowering/raising angle, a face turning angle, or a head leaning angle;

determining (306) whether each angle included in the head gesture information falls within a respective preset angle range; and

determining that the face image meets the feature extraction condition if each angle falls within the respective preset angle range.

4. The method of any preceding claim, wherein obtaining (202) the gesture recognition information of the dynamic face authentication prompt information by recognizing the facial gesture presented by the user, comprises:

obtaining (202) face tracking information by tracking a face of the user when the user presents a facial gesture according to the dynamic face authentication prompt information; and

analyzing the face tracking information to obtain the gesture recognition information of the user.

5. The method of claim 4, wherein analyzing the face tracking information to obtain the gesture recognition information of the user comprises:

when the face tracking information is facial key point position information, obtaining expression gesture recognition information of the user by analyzing the facial key point position information; or

when the face tracking information is head gesture information, obtaining head turning recognition information of the user by analyzing the head gesture information.

6. The method of any one of claims 1-5, wherein the dynamic face authentication prompt information comprises at least one type of the following information: expression action prompt information or voice read prompt information.

7. The method of claim 6, wherein the dynamic face authentication prompt information comprises the voice read prompt information, and obtaining (202) the gesture recognition information comprises:

obtaining mouth shapes and audio information of the user; and

recognizing one or more mouth shapes of the user when reading the voice read prompt information and obtaining voice information of the user from the audio information through voice recognition, wherein recognizing the one or more mouth shapes and obtaining the voice information enables the server to determine whether the voice information is consistent with the voice read prompt information when verifying the gesture recognition information, and the identity authentication is determined to be successful for the user upon verifying that the voice information is consistent with the voice read prompt

information and the gesture recognition information is consistent with the dynamic face authentication prompt information.

8. An identity authentication apparatus, wherein the apparatus comprises:

an acquisition unit configured to acquire (303) facial feature information of a user, and use the facial feature information acquired during the identity authentication as first facial feature information of the user, the acquisition unit comprising:

a face tracking subunit configured to track (302) a face of the user when the face of the user is detected;

an image acquisition subunit configured to acquire (303) a face image according to a preset time interval when the face is tracked;

a condition determination subunit configured to determine (304) whether the face image meets a preset feature extraction condition; and

a feature extraction subunit configured to extract (305) facial feature information of the user from the face image when the feature extraction condition is met;

a receiving unit (610) configured to receive (201) dynamic face authentication prompt information sent by a server during identity authentication of the user;

a recognition unit (620) configured to obtain (202) gesture recognition information of the dynamic face authentication prompt information by recognizing a facial gesture presented by the user; and

a sending unit (630), configured to:

send (308) the first facial feature information of the user to the server to allow the server to send the dynamic face authentication prompt information in response to verifying that the first facial feature information matches second facial feature information of the user that is stored, and

send (203) the gesture recognition information to the server to enable the server to confirm that the identity authentication of the user is successful upon verifying that the gesture recognition information is consistent with the dynamic face authentication prompt information.

9. The apparatus of claim 8, wherein the recognition unit (620) comprises:

a face information obtaining subunit configured to obtain face tracking information by tracking a face of the user when the user presents a facial gesture according to the dynamic face authentication prompt information; and

a face information analysis subunit configured to analyze the face tracking information to obtain the gesture recognition information of the user.

10. The apparatus of claim 9, wherein the face information analysis subunit is specifically configured to:

obtain expression gesture recognition information of the user by analyzing facial key point position information when the face tracking information is the facial key point position information; or

obtain head turning recognition information of the user by analyzing head gesture information when the face tracking information is the head gesture information.

11. The apparatus of any one of claims 8 to 10, wherein:

the acquisition unit is further configured to acquire facial feature information of the user during user registration, and use the facial feature information acquired during the registration as the second facial feature information of the user; and

the sending unit (630) is further configured to send (308) the second facial feature information to the server to allow the server to store (309) a correspondence relationship between a user name of the user and the second facial feature information.

12. The apparatus of any one of claims 8 to 11, wherein the condition determination subunit comprises:

a resolution determination module configured to determine whether a resolution of the face image meets a preset resolution threshold;

a gesture information extraction module configured to extract head gesture information from the face image if the resolution threshold is met, the head gesture information comprising at least one of the following angles: a head lowering/raising angle, a face turning angle, or a head leaning angle;

an angle determination module configured to determine whether each angle comprised in the head gesture information falls within a respective preset angle range; and

a judgment determination module configured to determine that the face image meets the feature extraction condition if each angle falls within the respective preset angle range.

13. A terminal comprising:

one or more processors; and

memory configured to store instructions executable by the one or more processors, the one or more processors configured to:

acquire facial feature information of a user, acquiring the facial feature information of the user comprising:

tracking (302) a face of the user upon detecting the face of the user;

acquiring (303) a face image according to a preset time interval when tracking the face;

determining (304) whether the face image meets a preset feature extraction condition; and

extracting (305) the facial feature information of the user from the face image in response to the feature extraction condition being met;

use the facial feature information as first facial feature information of the user;

send (308) the first facial feature information of the user to a server to allow the server to send dynamic face authentication prompt information in response to verifying that the first facial feature information matches second facial feature information of the user that is stored;

receive (201) the dynamic face authentication prompt information sent by a server during identity authentication of a user;

obtain (202) gesture recognition information of the dynamic face authentication prompt information by recognizing a facial gesture presented by the user; and

send (203) the gesture recognition information to the server to enable the server to confirm that the user passes the identity authentication upon verifying that the gesture recognition information is consistent with the dynamic face authentication prompt information.

14. The terminal of claim 13, wherein determining whether the face image meets the preset feature extraction condition comprises:

determining whether a resolution of the face image meets a preset resolution threshold;

extracting head gesture information from the face image if the resolution threshold is met, the head gesture information comprising at least one of a head lowering/raising angle, a face turning angle, or a head leaning angle;

determining whether each angle included in the head gesture information falls within a respective preset angle range; and

determining that the face image meets the feature extraction condition when each angle falls within the respective preset angle range.

15. The terminal of claim 13 or claim 14, wherein the dynamic face authentication prompt information comprises voice read prompt information, and obtaining the gesture recognition information comprises:

obtaining mouth shapes and audio information of the user; and

recognizing one or more mouth shapes of the user when reading the voice read prompt information and obtaining voice information of the user from the audio information through voice recognition, wherein recognizing the one or more mouth shapes and obtaining the voice information enables the server to determine whether the voice information is consistent with the voice read prompt information when verifying the gesture recognition information, and the identity authentication is determined to be successful for the user upon verifying that the voice information is consistent with the voice read prompt information and the gesture recognition information is consistent with the dynamic face authentication prompt information.