CLAIMS

What is claimed is:

1. A computer-implemented method for processing reference faces, comprising:

generating a plurality of reference features respectively corresponding to a plurality of reference faces of a user, wherein the plurality of reference faces of the user comprise at least a first reference face of the user and a second reference face of the user;

encrypting each of the plurality of reference features using a random value to obtain a plurality of encrypted features, wherein the plurality of encrypted features are associated with the plurality of reference features such that a final similarity score between an authentication input and the plurality of reference faces of the user can be calculated based on the authentication input and the plurality of encrypted features; and

discarding the plurality of reference features and the random value.

2. The method as claimed in claim 1, further comprising storing the plurality of encrypted features.

3. The method as claimed in claim 1 or 2, wherein the plurality of reference features comprise reference face feature vectors, and wherein generating the plurality of reference features corresponding to the plurality of reference faces of the user comprises:

receiving the plurality of reference faces of the user;

converting, by a face recognition model, each of the plurality of reference faces to a corresponding reference face feature vector; and

discarding the plurality of reference faces.

4. The method as claimed in claim 3, wherein encrypting each of the plurality of reference features comprises:

generating, by a random number generator, a random noise feature vector as the random value; and

encrypting each of the reference face feature vectors based on the random noise feature vector.

5. The method as claimed in claim 4, wherein the first reference face is converted to a first reference face feature vector and the second reference face is converted to a second reference face feature vector, and wherein encrypting each of the reference face feature vectors comprises:

encrypting the first reference face feature vector by adding the random noise feature vector to the first reference face feature vector; and

encrypting the second reference face feature vector by subtracting the random noise feature vector from the second reference face feature vector.

6. A computer-implemented method for face recognition, comprising:

receiving an authentication input;

determining respective similarity scores between the authentication input and a plurality of encrypted features, wherein the plurality of encrypted features are obtained by encrypting, using a random value, each of a plurality of reference features that respectively correspond to a plurality of reference faces of a user, wherein the plurality of reference faces of the user comprise at least a first reference face of the user and a second reference face of the user;

calculating, based on the respective similarity scores, a final similarity score between the authentication input and the plurality of reference faces of the user; and

verifying the authentication input based on the final similarity score.

7. The method as claimed in claim 6, wherein determining the respective similarity scores comprises determining the respective similarity scores using a linear similarity function.

8. The method as claimed in claim 7, wherein the linear similarity function comprises a vector dot product.

9. The method as claimed in claim 7 or 8, wherein calculating, based on the respective similarity scores, the final similarity score between the authentication input and the plurality of reference faces of the user comprises calculating an average value of the respective similarity scores.

10. The method as claimed in any one of claims 6 to 9, wherein receiving the authentication input comprises:

receiving a face image of a user to be authenticated; and

converting, by a face recognition model, the received face image to a face feature vector.

11. The method as claimed in 10, wherein the face image comprises a face image collected during a login procedure or during a payment procedure.

12. A computer-implemented system, comprising:

one or more processors; and

one or more computer-readable memories coupled to the one or more processors and having instructions stored thereon that are executable by the one or more processors to perform the method of any one of claims 1 to 11.

13. An apparatus comprising a plurality of modules for performing the method of any one of claims 1 to 11.