

CLAIMS

1. A face recognition method, comprising:

performing attribute feature extraction on an image to be processed comprising a target object to obtain N attribute features of the target object, N being an integer greater than 1;

performing attention feature extraction on the image to be processed based on an attention mechanism to obtain N attention features of the target object, wherein the attention features are features that are specified to be extracted and the attention features belong to the attribute features;

clustering the N attention features to obtain M clustered attention features, M being a positive integer and $M < N$; and

determining a face recognition result of the target object according to the N attribute features and the M clustered attention features.

2. The method according to claim 1, wherein the clustering the N attention features to obtain the M clustered attention features comprises:

clustering the N attention features to obtain M cluster sets, each of the N attention features corresponding to one of the M cluster sets; and

respectively determining a clustered attention feature of each of the M cluster sets to obtain the M clustered attention features.

3. The method according to claim 1 or 2, further comprising:

multiplying the N attribute features respectively by the N attention features to obtain N enhanced attribute features,

wherein the determining the face recognition result of the target object according to the N attribute features and the M clustered attention features comprises:

respectively correcting the N enhanced attribute features according to the M clustered attention features to obtain the face recognition result of the target object.

4. The method according to claim 1 or 2, wherein the determining the face recognition result of the target object according to the N attribute features and the M clustered attention features comprises:

respectively correcting the N attribute features according to the M clustered attention

features to obtain the face recognition result.

5. The method according to claim 3, wherein the respectively correcting the N enhanced attribute features according to the M clustered attention features to obtain the face recognition result of the target object comprises:

multiplying the N enhanced attribute features respectively by the clustered attention features corresponding to at least some of the N attribute features to obtain the face recognition result.

6. The method according to claim 4, wherein the respectively correcting the N attribute features according to the M clustered attention features to obtain the face recognition result of the target object comprises:

multiplying the N attribute features respectively by the clustered attention features corresponding to the at least some of the N attribute features to obtain the face recognition result.

7. The method according to any one of claims 1 to 6, implemented by a neural network comprising a multi-task convolution network, a plurality of individual attention networks, and a clustering network, wherein the multi-task convolution network is configured to perform the attribute feature extraction on the image to be processed, the plurality of individual attention networks are configured to perform the attention feature extraction on the image to be processed, and the clustering network is configured to cluster the N attention features.

8. The method according to claim 7, further comprising:

adjusting network parameters of the multiple individual attention networks according to a network loss of the clustering network during training of the neural network.

9. The method according to any one of claims 1 to 8, wherein the clustering comprises spectral clustering, and the M clustered attention features are respectively cluster centers of the M cluster sets.

10. A face recognition apparatus, comprising:

an attribute extraction module, configured to perform attribute feature extraction on an image to be processed comprising a target object to obtain N attribute features of the target object, N being an integer greater than 1;

an attention extraction module, configured to perform attention feature extraction on the image to be processed based on an attention mechanism to obtain N attention features of the

target object, wherein the attention features are features that are specified to be extracted and the attention features belong to the attribute features;

a clustering module, configured to cluster the N attention features to obtain M clustered attention features, M being a positive integer and $M < N$; and

a result determination module, configured to determine the face recognition result of the target object according to the N attribute features and the M clustered attention features.

11. The apparatus according to claim 10, wherein the clustering module comprises:

a clustering sub-module, configured to cluster the N attention features to obtain M cluster sets, each of the N attention features corresponding to one of the M cluster sets; and

a feature determination sub-module, configured to respectively determine a clustered attention feature of each of the M cluster sets to obtain the M clustered attention features.

12. The apparatus according to claim 10 or 11, further comprising:

an attribute enhancement module, configured to multiply the N attribute features respectively by the N attention features to obtain N enhanced attribute features,

wherein the result determination module comprises:

a first correction sub-module, configured to respectively correct the N enhanced attribute features according to the M clustered attention features to obtain the face recognition result of the target object.

13. The apparatus according to claim 10 or 11, wherein the result determination module comprises:

a second correction sub-module, configured to respectively correct the N attribute features according to the M clustered attention features to obtain the face recognition result.

14. The apparatus according to claim 12, wherein the first correction sub-module comprises:

a first multiplication sub-module, configured to multiply the N enhanced attribute features respectively by the clustered attention features corresponding to the attribute features to obtain the face recognition result.

15. The apparatus according to claim 13, wherein the second correction sub-module comprises:

a second multiplication sub-module, configured to multiply the N attribute features respectively by the clustered attention features corresponding to the attribute features to obtain

the face recognition result.

16. The apparatus according to any one of claims 10 to 15, implemented by a neural network comprising a multi-task convolution network, a plurality of individual attention networks, and a clustering network, wherein the multi-task convolution network is configured to perform the attribute feature extraction on the image to be processed, the multiple individual attention networks are configured to perform the attention feature extraction on the image to be processed, and the clustering network is configured to cluster the N attention features,

the apparatus further comprising:

a parameter adjustment module, configured to adjust network parameters of the multiple individual attention networks according to the network loss of the clustering network during training of the neural network.

17. The apparatus according to any one of claims 10 to 16, wherein the clustering comprises spectral clustering, and the M clustered attention features are respectively cluster centers of the M cluster sets.

18. An electronic device, comprising:

a processor; and

a memory, configured to store processor-executable instructions;

wherein the processor is configured to execute the method according to any one of claims 1 to 9.

19. A computer-readable storage medium, having computer program instructions stored thereon, wherein the computer program instructions, when being executed by a processor, enable the processor to implement the method according to any one of claims 1 to 9.

20. A computer program product, wherein the computer program product, when being executed by a processor, enables the processor to implement the method according to any one of claims 1 to 9.