CLAIMS

1. A method for positioning face feature points, comprising:

performing edge detection on a face image to obtain a face feature line image; and

fusing the face image and the face feature line image to obtain position information of face feature points.

2. The method according to claim 1, before the fusing the face image and the face feature line image, further comprising:

performing validity determination on the face feature line image to obtain an optimized face feature line image; and

the fusing the face image and the face feature line image to obtain position information of face feature points comprising:

fusing the face image and the optimized face feature line image to obtain the position information of the face feature points.

3. The method according to claim 1, wherein the performing edge detection on a face image to obtain a face feature line image comprises:

performing feature line feature extraction on the face image to obtain a feature line image; and

optimizing the feature line image to obtain the face feature line image.

4. The method according to claim 3, wherein the performing feature line feature extraction on

the face image to obtain a feature line image comprises:

sequentially performing a convolution operation, a residual operation, a downsampling operation, and another residual operation on the face image to obtain the feature line image.

5. The method according to claim 3, wherein the optimizing the feature line image to obtain the face feature line image comprises:

subjecting the feature line image to at least one stage of optimization network to obtain the face feature line image, wherein each stage of the optimization network comprises a hourglass-shaped network used for realizing a residual operation and an information transmission layer used for realizing feature line information transmission.

6. The method according to claim 1, wherein the fusing the face image and the face feature line image to obtain position information of face feature points comprises:

performing input image fusion on the face image to obtain a first fusion image;

performing at least one stage of edge image fusion on the first fusion image and the face feature line image to obtain a second fusion image; and

mapping the second fusion image to obtain position vectors of feature points, and taking the position vectors as the position information of the face feature points.

7. The method according to claim 6, before performing at least one stage of edge image fusion on the first fusion image and the face feature line image, further comprising:

performing optimization processing on the first fusion image to obtain an optimized first fusion image, wherein the optimization processing sequentially comprises a convolution operation, a downsampling operation, and a residual operation.

8. The method according to claim 6, wherein the performing input image fusion on the face image to obtain a first fusion image comprises:

multiplying the face image by each predefined feature line image pixel by pixel to obtain a plurality of boundary features having one-to-one correspondence to the each predefined feature line image; and

superposing the plurality of boundary features and the face image to obtain the first fusion image.

9. The method according to claim 6, wherein the performing at least one stage of edge image fusion on the first fusion image and the face feature line image to obtain a second fusion image comprises:

superposing the first fusion image and the face feature line image to obtain a third fusion image;

performing a residual operation on the third fusion image to obtain a fourth fusion image having a same size as the face feature line image;

multiplying the first fusion image by the fourth fusion image pixel by pixel to obtain a fifth fusion image; and

superposing the first fusion image and the fifth fusion image to obtain the second fusion image.

10. The method according to claim 6, among each stage of edge image fusion, further comprising: performing a residual operation on a result of each stage of edge fusion.

11. The method according to claim 6, wherein the mapping the second fusion image to obtain position vectors of feature points comprises:

sequentially performing a residual operation and a full-connection operation on the second fusion image to obtain the position vectors of the feature points.

12. An apparatus for positioning face feature points, comprising:

an edge detection module, configured to perform edge detection on a face image to obtain a face feature line image; and

a fusion module, configured to fuse the face image and the face feature line image to obtain position information of face feature points.

13. The apparatus according to claim 12, wherein the apparatus further comprises:

a determination module, configured to perform validity determination on the face feature line image to obtain an optimized face feature line image; and

the fusion module, configured to:

fuse the face image and the optimized face feature line image to obtain position information of face feature points.

14. The apparatus according to claim 12, wherein the edge detection module comprises:

a feature extraction submodule, configured to perform feature line feature extraction on the face image to obtain a feature line image; and

a first optimization submodule, configured to optimize the feature line image to obtain the face feature line image.

15. The apparatus according to claim 14, wherein the feature extraction submodule is

configured to:

sequentially perform convolution, a residual operation, downsampling, and another residual operation on the face image to obtain the feature line image.

16. The apparatus according to claim 14, wherein the first optimization submodule is configured to:

subject the feature line image to at least one stage of optimization network to obtain the face feature line image, wherein each stage of optimization network comprises a hourglass-shaped network used for realizing a residual operation and an information transmission layer used for realizing feature line information transmission.

17. The apparatus according to claim 12, wherein the fusion module comprises:

a first fusion submodule, configured to perform input image fusion on the face image to obtain a first fusion image;

a second fusion submodule, configured to perform at least one stage of edge image fusion on the first fusion image and the face feature line image to obtain a second fusion image; and

a mapping submodule, configured to map the second fusion image to obtain position vectors of feature points, and take the position vectors as the position information of the face feature points.

18. The apparatus according to claim 17, wherein the fusion module further comprises:

a second optimization submodule, configured to perform optimization processing on the first fusion image to obtain an optimized first fusion image, wherein the optimization processing sequentially comprises convolution, downsampling, and a residual operation.

19. 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 11.

20. A computer-readable storage medium, having computer program instructions stored thereon, wherein when the computer program instructions are executed by a processor, the method according to any one of claims 1 to 11 is implemented.