CLAIMS

1. An image processing method, comprising:

acquiring a first feature map of an image to be processed;

determining a final weight vector of the first feature map;

determining a target normalization manner corresponding to the first feature map in a preset normalization set according to the final weight vector; and

performing normalization processing on the first feature map in the target normalization manner to obtain a second feature map.

2. The method of claim 1, wherein acquiring the first feature map of the image to be processed comprises:

performing feature extraction on the image to be processed by using a convolutional layer in a neural network to obtain the first feature map; and

wherein, a preset parameter set comprises a first hyper-parameter, a second hyper-parameter and a learning parameter; and determining the final weight vector of the first feature map comprises:

calculating the final weight vector of the first feature map according to the first hyper-parameter, the second hyper-parameter and the learning parameter in the preset parameter set.

3. The method of claim 2, wherein calculating the final weight vector of the first feature map according to the first hyper-parameter, second hyper-parameter and learning parameter in the preset parameter set comprises:

determining a preset constraint condition according to the first hyper-parameter and the second hyper-parameter; and

determining the final weight vector of the first feature map according to the constraint condition and the learning parameter, wherein the learning parameter is configured to calculate the final weight vector of the first feature map, the first hyper-parameter is configured to represent a center of a preset simplex and the second hyper-parameter is configured to reduce a value range of the final weight vector.

4. The method of claim 3, wherein the preset constraint condition is that a distance between the final weight vector and the first hyper-parameter is limited to be greater than or equal to a value of the second hyper-parameter.

5. The method of claim 1, wherein determining the final weight vector of the first feature map comprises: determining a mean vector and variance vector of the first feature map, and determining, according to the preset constraint condition and the learning parameter, a mean final weight vector corresponding to the mean vector and a variance final weight vector corresponding to the variance vector respectively;

wherein determining the target normalization manner corresponding to the first feature map in the preset normalization set according to the final weight vector comprises: correspondingly determining a first mean sub-normalization manner and a second variance sub-normalization manner according to the mean final weight vector and the variance final weight vector respectively, wherein the first sub-normalization manner and the second sub-normalization manner are the same or different; and

wherein performing normalization processing on the first feature map in the target normalization manner to obtain the second feature map comprises: correspondingly normalizing the mean vector and the variance vector according to the first sub-normalization manner and the second sub-normalization manner to obtain a normalized mean vector and a normalized variance vector; and obtaining the second feature map according to the normalized mean vector, the normalized variance vector and the first feature map.

6. The method of claim 5, wherein determining the mean vector and variance vector of the first feature map comprises:

determining the mean vector and variance vector of the first feature map based on the preset normalization set,

wherein a dimension of the mean vector and a dimension of the variance vector are the same as a number of normalization manners in the preset normalization set,

wherein a mean of the mean vector in an i-th dimension correspond to a j-th normalization manner in the preset normalization set, a variance of the variance vector in the i-th dimension correspond to the j-th normalization manner in the preset normalization set, i and j being integers greater than 0 and less than or equal to the number of the normalization manners in the preset normalization set.

7. The method of any one of claims 2 to 6, comprising:

determining a dimension of the learning parameter, a dimension of the first hyper-parameter and a value of the first hyper-parameter in each dimension according to the number of the normalization manners in the preset normalization set, wherein a sum of values of the first hyper-parameter in each dimension is 1, the dimension of the first hyper-parameter is the same as the dimension of the learning parameter, the first hyper-parameter has the same value in each dimension, and the sum of values in each dimension is 1; and

determining a distance from a center to a vertex of a preset simplex, and determining the distance as a preset threshold corresponding to the second hyper-parameter, wherein the preset simplex has a preset fixed value for each edge and a number of vertexes thereof is the same as the number of normalization manners, and the second hyper-parameter has a value greater than 0 and less than or equal to the preset threshold.

8. The method of claim 2, wherein calculating the final weight vector of the first feature map according to the first hyper-parameter, second hyper-parameter and learning parameter in the preset parameter set comprises:

determining a first sub-weight vector according to the second hyper-parameter and the learning parameter; and

determining the first sub-weight vector as the final weight vector if a distance between the first sub-weight vector and the first hyper-parameter is greater than or equal to the second hyper-parameter.

9. The method of claim 8, wherein after determining the first sub-weight vector according to the second hyper-parameter and the learning parameter, the method further comprises:

determining a second sub-weight vector according to the first hyper-parameter, the second hyper-parameter and the first sub-weight vector if the distance between the first sub-weight vector and the first hyper-parameter is less than the second hyper-parameter; and

determining the second sub-weight vector as the final weight vector if the second sub-weight vector is greater than or equal to 0.

10. The method of claim 9, wherein after determining the second sub-weight vector according to the first hyper-parameter, the second hyper-parameter and the first sub-weight vector, the method further comprises:

updating the first hyper-parameter according to the second sub-weight vector to obtain an updated first hyper-parameter, if the second sub-weight vector is less than zero;

determining an updated second hyper-parameter according to the second

hyper-parameter, the updated first hyper-parameter and a first hyper-parameter that is not updated;

determining a third sub-weight vector according to the second sub-weight vector and the learning parameter; and

determining the final weight vector according to the updated first hyper-parameter, the updated second hyper-parameter and the third sub-weight vector.

11. The method of claim 5, wherein correspondingly normalizing the mean vector and the variance vector according to the first sub-normalization manner and the second sub-normalization manner to obtain the normalized mean vector and the normalized variance vector respectively comprises:

multiplying a weight of the mean final weight vector in each dimension and a weight of the mean vector in each dimension in a one-to-one correspondence manner, and adding products obtained in each dimension to obtain the normalized mean vector; and

multiplying a weight of the variance final weight vector in each dimension and a variance of the variance vector in each dimension in a one-to-one correspondence manner, and adding products obtained in each dimension to obtain the normalized variance vector.

12. The method of claim 5, wherein obtaining the second feature map according to the normalized mean vector, the normalized variance vector and the first feature map comprises:

determining a difference between the first feature map and the normalized mean vector;

determining a mean variance corresponding to a sum of the normalized

variance vector and a preset adjustment amount;

determining a ratio of the difference to the mean variance;

scaling the ratio according to a preset scaling parameter to obtain a scaled ratio; and

adjusting the scaled ratio according to a preset shift parameter to obtain the second feature map.

13. An image processing device, comprising: a first acquisition module, a first calculation module, a first determination module and a first processing module, wherein

the first acquisition module is configured to acquire a first feature map of an image to be processed;

the first calculation module is configured to determine a final weight vector of the first feature map;

the first determination module is configured to determine a target normalization manner corresponding to the first feature map in a preset normalization set according to the final weight vector; and

the first processing module is configured to perform normalization processing on the first feature map in the target normalization manner to obtain a second feature map.

14. The device of claim 13, wherein the first acquisition module comprises:

a first extraction submodule, configured to perform feature extraction on the image to be processed by using a convolutional layer in a neural network to obtain the first feature map;

correspondingly, a preset parameter set comprises a first hyper-parameter, a

second hyper-parameter and a learning parameter; and wherein the first calculation module comprises:

a first calculation submodule, configured to calculate the final weight vector of the first feature map according to the first hyper-parameter, the second hyper-parameter and the learning parameter in the preset parameter set.

15. The device of claim 14, wherein the first calculation submodule comprises:

a first determination unit, configured to determine a preset constraint condition according to the first hyper-parameter and the second hyper-parameter; and

a second determination unit, configured to determine the final weight vector of the first feature map according to the constraint condition and the learning parameter, wherein the learning parameter is configured to calculate the final weight vector of the first feature map, the first hyper-parameter is configured to represent a center of a preset simplex and the second hyper-parameter is configured to reduce a value range of the final weight vector.

16. The device of claim 15, wherein the preset constraint condition is that a distance between the final weight vector and the first hyper-parameter is limited to be greater than or equal to a value of the second hyper-parameter.

17. The device of claim 13, wherein the first acquisition module comprises: a first determination submodule, configured to determine a mean vector and variance vector of the first feature map, and

a second determination submodule, configured to determine, according to the preset constraint condition and the learning parameter, a mean final weight vector corresponding to the mean vector and a variance final weight vector corresponding to the variance vector respectively;

wherein the first determination module comprises a third determination submodule, configured to correspondingly determine a first mean sub-normalization manner and a second variance sub-normalization manner according to the mean final weight vector and the variance final weight vector respectively, wherein the first sub-normalization manner and the second sub-normalization manner are the same or different; and

wherein the first processing module comprises: a first normalization submodule, configured to correspondingly normalize the mean vector and the variance vector according to the first sub-normalization manner and the second sub-normalization manner to obtain a normalized mean vector and a normalized variance vector respectively, and

a fourth determination submodule, configured to obtain the second feature map according to the normalized mean vector, the normalized variance vector and the first feature map.

18. A computer storage medium, having stored therein computer-executable instructions that, when being executed, enable to implement the steps of the method of any one of claims 1 to 12.

19. A computer device, comprising a memory and a processor, wherein the memory is configured to store computer-executable instructions, and the processor is configured to execute the computer-executable instructions in the memory to implement the steps of the method of any one of claims 1 to 12.

20. A computer program product, comprising computer-executable instructions that, when being executed, enable to implement the steps of the method of any one of claims 1 to 12.