CLAIMS

1. A method for determining face liveness, comprising:

obtaining a first image being an image associated with a face;

generating training data by processing the first image;

training an artificial intelligence model by using the training data;

extracting a feature vector of a second image by inputting the second image associated with a face to the artificial intelligence model;

inputting the feature vector to a fully connected layer to output a two-dimensional vector whose sum of components is 1, wherein the fully connected layer includes one or more sub-layers and wherein each sub-layer includes a plurality of perceptrons using weights and biases; and

outputting a liveness result value about second image through the fully connected layer,

wherein the step of outputting the two-dimensional vector includes:

corresponding M input values of the M-dimensional feature vector to each of the M perceptrons included in a first sub-layer of the fully connected layer,

obtaining M result values by multiplying each of the M input values by a weight using M perceptrons,

obtaining a first result vector of N dimensions smaller than the M dimension by inputting a value obtained by adding a first bias to the sum of the M result values into a nonlinear function,

corresponding N input values of the N-dimensional first result vector to each of N perceptrons included in a second sub-layer of the fully connected

layer,

obtaining N result values by multiplying each of the N input values by a weight using N perceptrons, and

obtaining a second result vector of K dimensions smaller than the N dimension by inputting a value obtained by adding a second bias to the sum of the N result values into a nonlinear function,

by a model learned so that the loss function converges to 0, wherein the weights multiplied by the M perceptrons and the N perceptrons, the first bias, and the second bias are set differently depending on the vector input to the first sub-layer and the second sub-layer.

2. The method of claim 1, wherein the training data include one or more processing images obtained through rotation, enlargement, horizontal movement, vertical movement, tilting, or horizontal flipping of the first image.

3. The method of claim 2, wherein the training data include a first processing image included in one or more processing images, wherein the first processing image is obtained by rotating the first image as much as 20 degrees.

4. The method of claim 3, wherein the training data include a second processing image included in one or more processing images, wherein the first processing image is obtained by enlarging the first image as much as 1.15 times.

5. The method of claim 3, wherein the training data include a third

processing image included in one or more processing images, wherein the first processing image is obtained by moving the first image horizontally or vertically as much as a 0.2 ratio.

6. The method of claim 3, wherein the training data include a fourth processing image included in one or more processing images, wherein the first processing image is obtained by tilting the first image as much as 0.15 degrees.

7. The method of claim 3, wherein the training data include a fifth processing image included in one or more processing images, wherein the first processing image is obtained by flipping the first image horizontally.

8. A face liveness determining device comprising:

a processor configured to:

obtain a first image being an image associated with a face;

generate training data by processing the first image;

train an artificial intelligence model by using the training data;

extract a feature vector of a second image by inputting the second image associated with a face to the artificial intelligence model;

input the feature vector to a fully connected layer to output a two-dimensional vector whose sum of components is 1, wherein the fully connected layer includes one or more sublayers and wherein each sub-layer includes a plurality of perceptrons using weights and biases;

output a liveness result value associated with the second image through the fully connected layer;

correspond M input values of the M-dimensional feature vector to each of the M perceptrons included in a first sub-layer of the fully connected layer,

obtain M result values by multiplying each of the M input values by a weight using M perceptrons,

obtain a first result vector of N dimensions smaller than the M dimension by inputting a value obtained by adding a first bias to the sum of the M result values into a nonlinear function,

correspond N input values of the N-dimensional first result vector to each of N perceptrons included in a second sub-layer of the fully connected layer,

obtain N result values by multiplying each of the N input values by a weight using N perceptrons, and

obtain a second result vector of K dimensions smaller than the N dimension by inputting a value obtained by adding a second bias to the sum of the N result values into a nonlinear function,

using a model learned so that the loss function converges to 0, wherein the weights multiplied by the M perceptrons and the N perceptrons, the first bias, and the second bias are set differently according to the vector input to the first sub-layer and the second sub-layer.