CLAIMS

Claim 1 A verification apparatus used in a gate provided with a regulator that regulates a stream of people, the verification apparatus comprising:

a processor that carries out, in a path with a stream of people from a first area to a second area located upstream of the regulator, second facial image verification by using a first candidate facial image narrowed down from multiple facial images contained in a facial image database based on the result of first facial image verification using a facial image included in a first image taken of the first area and multiple facial images contained in the facial image database, and a facial image included in a second image taken of the second area; and

a communicator that outputs a result of the second facial image verification.

Claim 2 The verification apparatus according to claim 1, wherein

the gate comprises a sensor that detects entry of a person to the gate, and

the second area is located in the stream of people, at or downstream of a position where the entry of a person is detected and upstream of the regulator.

Claim 3 The verification apparatus according to claim 1, wherein the processor narrows down the first candidate facial image by using a third image taken of a third area between the first area and the second area, and verifies a second candidate facial image, which is obtained by the narrowing down, against the second image.

Claim 4 The verification apparatus according to claim 3, wherein:

the communicator obtains the first candidate facial image from a server provided outside the verification apparatus, and

the verification apparatus obtains the second candidate facial image by narrowing down

the first candidate facial image in the verification apparatus.

Claim 5 The verification apparatus according to claim 3, wherein:

the processor determines a score indicating similarity of two facial images between each of N_1 first candidate facial images (N_1 being an integer of 2 or greater) and the third image, and

the processor determines the second candidate facial image obtained by narrowing down the first candidate facial images to candidates corresponding to top N_2 scores among the N_1 scores (N_2 being an integer of 1 or greater and less than N_1).

Claim 6 The verification apparatus according to claim 3, wherein:

the processor determines a score indicating similarity of two facial images between each of a plurality of the first candidate facial images and the third image,

the processor determines the second candidate facial image obtained by narrowing down the first candidate facial image to a candidate having the score greater than or equal to a second threshold value,

the first candidate facial image has the score with the first image greater than or equal to a first threshold value, and

the first threshold value is smaller than the second threshold value.

Claim 7 The verification apparatus according to claim 6, wherein the processor does not determine the second candidate facial image when a number of the plurality of first candidate facial images is less than a third threshold value.

Claim 8 The verification apparatus according to claim 6, wherein the processor does not

carry out verification against the second image when a number of one or a plurality of the second candidate facial images is less than a fourth threshold value.

Claim 9 The verification apparatus according to claim 6, wherein the processor requests a server provided outside the verification apparatus to determine the second candidate facial image when each of a plurality of the scores between each of the plurality of first candidate facial images and the third image is less than a fifth threshold value.

Claim 10 The verification apparatus according to claim 1, wherein the processor requests a server provided outside the verification apparatus to carry out verification related to the second image when verification against the second image has failed.

Claim 11 A verification system used in a gate provided with a regulator that regulates a stream of people, the verification system comprising:

a first camera that takes an image of a first area in a stream of people from the first area to a second area located upstream of the regulator;

a second camera that takes an image of the second area;

a first verification apparatus that carries out first facial image verification using a first image taken by the first camera; and

a second verification apparatus that carries out second facial image verification using a first candidate facial image narrowed down from multiple facial images contained in a first image database based on the result of the first facial image verification using a facial image included in the first image taken of the first area and multiple facial images contained in the facial image database, and a facial image included in a second image taken by the second camera.

Claim 12 The verification system according to claim 11, wherein the first camera and the second camera are installed in the gate or in an installation site of the gate.

Claim 13 The verification system according to claim 12, wherein:

the first verification apparatus is provided on the server,

the second verification apparatus is provided in the gate, and

the second verification apparatus receives the first candidate facial image from the server.

Claim 14 The verification system according to claim 12 comprising a control apparatus that controls the gate on based on a result of the second facial image verification input from the second verification apparatus.

Claim 15 A verification method used in a gate provided with a regulator that regulates a stream of people, the verification method comprising:

carrying out, in a path with a stream of people from a first area to a second area located upstream of the regulator, second facial image verification by using a first candidate facial image narrowed down from multiple facial images contained in a facial image database based on the result of first facial image verification using a first facial image included in a first image taken of the first area and multiple facial images contained in the facial image database, and a facial image included in a second image taken of the second area; and

outputting a result of the second facial image verification.