DESCRIPTION

MASTER FACE IMAGE REGISTRATION APPARATUS, REGISTRATION METHOD, PROGRAM, AND RECORDING MEDIUM

TECHNICAL FIELD

[0001] The present invention relates to a master face image registration apparatus, a registration method, a program, and a recording medium for face image authentication.

BACKGROUND ART

[0002] In various fields, personal authentication by face image analysis (hereinafter, referred to as face image authentication) is used. In the face image authentication, a face image of a registered person is stored in advance as a master face image, a face image of a person to be authenticated obtained in live as a query image is collated with the master face image, and a person to be authenticated is authenticated as the registered person when the face image matches the master face image.

[0003] However, in face image authentication, a so-called false authentication may occur in which a person to be authenticated is authenticated as a registered person different from the person himself/herself to be authenticated. Therefore, suppression of false authentication is an important issue in face image authentication.

SUMMARY

[0004] With the foregoing in mind, the present disclosure to provide a new system for suppressing the occurrence of false authentication.

[0005] The present disclosure provides a master face image registration apparatus, including: an image information acquisition unit; a false authentication information extraction unit; a similarity determination unit; a score calculation unit; an aptitude determination unit; and an output unit, wherein the image information acquisition unit acquires a candidate face image and attribute information of an imaging attribute item related to imaging of the candidate face image in association with each other as candidate information of a master face image for face image authentication, the false authentication information extraction unit extracts attribute information on the same imaging attribute item as the candidate face image from a database that stores attribute information that participate in false authentication among attribute information of imaging attribute items of master face images resulting in false authentication in face image authentication, the similarity determination unit determines whether or not the extracted attribute information of the imaging

attribute item is similar to the attribute information of the imaging attribute item of the master face image, when it is determined to be similar, the score calculation unit assigns a weight indicating a degree of participation in an occurrence of false authentication set for each imaging attribute item and calculates a total score by summing the weight for each imaging attribute, when the total score satisfies a predetermined threshold value, the aptitude determination unit determines that the candidate face image is inappropriate as a master face image, and when it is determined to be inappropriate, the output unit outputs a determination result indicating that the candidate face image is inappropriate as the master face image.

[0006] The present disclosure also provides a master face image registration method, including the steps of: acquiring image information; extracting false authentication information; determining similarity; calculating a score; determining an aptitude, and outputting, wherein the image information-acquiring acquires a candidate face image and attribute information of an imaging attribute item related to imaging of the candidate face image in association with each other as candidate information of a master face image for face image authentication, the false authentication information-extracting extracts attribute information on the same imaging attribute item as the candidate face image from a database that stores attribute information that participate in false authentication among attribute information of imaging attribute items of master face images resulting in false authentication in face image authentication, the similarity-determining determines whether or not the extracted attribute information of the imaging attribute item is similar to the attribute information of the imaging attribute item of the master face image, when it is determined to be similar, the score-calculating assigns a weight indicating a degree of participation in an occurrence of false authentication set for each imaging attribute item and calculates a total score by summing the weight for each imaging attribute, when the total score satisfies a predetermined threshold value, the aptitude-determining determines that the candidate face image is inappropriate as a master face image, and when it is determined to be inappropriate, the outputting outputs a determination result indicating that the candidate face image is inappropriate as the master face image.

[0007] The present disclosure also provides a program for a computer to execute the registration method according to the present disclosure.

[0008] The present disclosure also provides a computer readable recording medium with the program according to the present disclosure.

[0009] According to the present disclosure, since it is possible to determine whether or not a master face image candidate has a possibility of causing false authentication, the candidate

Claims

1. A master face image registration apparatus, comprising:

an image information acquisition unit;

a false authentication information extraction unit;

a similarity determination unit;

a score calculation unit;

an aptitude determination unit; and

an output unit, wherein

the image information acquisition unit acquires a candidate face image and attribute information of an imaging attribute item related to imaging of the candidate face image in association with each other as candidate information of a master face image for face image authentication,

the false authentication information extraction unit extracts attribute information on the same imaging attribute item as the candidate face image from a database that stores attribute information that participate in false authentication among attribute information of imaging attribute items of master face images resulting in false authentication in face image authentication,

the similarity determination unit determines whether or not the extracted attribute information of the imaging attribute item is similar to the attribute information of the imaging attribute item of the master face image,

when it is determined to be similar, the score calculation unit assigns a weight indicating a degree of participation in an occurrence of false authentication set for each imaging attribute item and calculates a total score by summing the weight for each imaging attribute,

when the total score satisfies a predetermined threshold value, the aptitude determination unit determines that the candidate face image is inappropriate as a master face image, and

when it is determined to be inappropriate, the output unit outputs a determination result indicating that the candidate face image is inappropriate as the master face image.

2. The registration apparatus according to claim 1, wherein

when it is determined that the candidate face image is inappropriate as the master face image, the output unit outputs an alert for registration as the master face image.

3. The registration apparatus according to claim 1 or 2, wherein

the imaging attribute item includes at least one of an attribute item of a shooting condition or an attribute item of a captured image.

4. The registration apparatus according to claim 3, wherein

the attribute item of the shooting condition includes at least one selected from the group consisting of a photographer, a location, a season, a period, a date, a time, a weather, a type of illumination, a distance, and a shooting method.

5. The registration apparatus according to claim 3 or 4, wherein

the attribute item of the captured image includes at least one of a size of a face in the captured image or an inclination of the face in the image.

6. The registration apparatus according to any one of claims 1 to 5, further comprising:

a master face image storage unit, wherein

when the total score does not satisfy the predetermined threshold value, the aptitude determination unit determines that the candidate face image is appropriate as a master face image, and

the master face image storage unit stores the candidate face image and attribute information of the candidate face image in association with each other as master face image information.

7. A master face image registration method, comprising the steps of:

acquiring image information;

extracting false authentication information;

determining similarity;

calculating a score;

determining an aptitude, and

outputting, wherein

the image information-acquiring acquires a candidate face image and attribute information of an imaging attribute item related to imaging of the candidate face image in association with each other as candidate information of a master face image for face image authentication,

the false authentication information-extracting extracts attribute information on the same imaging attribute item as the candidate face image from a database that stores attribute information that participate in false authentication among attribute information of imaging attribute items of master face images resulting in false authentication in face image authentication,

the similarity-determining determines whether or not the extracted attribute information of the imaging attribute item is similar to the attribute information of the imaging attribute item of the master face image,

when it is determined to be similar, the score-calculating assigns a weight indicating a degree of participation in an occurrence of false authentication set for each imaging attribute item and calculates a total score by summing the weight for each imaging attribute,

when the total score satisfies a predetermined threshold value, the aptitude-determining determines that the candidate face image is inappropriate as a master face image, and

when it is determined to be inappropriate, the outputting outputs a determination result indicating that the candidate face image is inappropriate as the master face image.

8. A face image authentication apparatus, comprising:

a registration unit of a master face image for face image authentication;

an acquisition unit of a query face image for face image authentication; and

an authentication unit, wherein

the registration unit comprises the registration apparatus according to any one of claims 1 to 6, and registers a candidate face image, which has not been determined to be inappropriate as a master face image, as a master face image,

the acquisition unit acquires a query face image, and

the authentication unit collates the query face image with the registered master face image and authenticates personal identification if they match and does not authenticate personal identification if they do not match.

9. A face image authentication method, comprising the steps of:

registering a master face image for face image authentication;

acquiring a query face image for face image authentication; and

authenticating, wherein

the registering comprises the registration method according to claim 8, and registers

a candidate face image, which has not been determined to be inappropriate as a master face image, as a master face image,

the acquiring acquires a query face image, and

the authenticating collates the query face image with the registered master face image and authenticates personal identification if they match and does not authenticate personal identification if they do not match.

10. A computer readable recording medium with a program for a computer to execute the method according to claim 8 or 9.