DESCRIPTION

FACE AUTHENTICATION APPARATUS, FACE AUTHENTICATION METHOD, PROGRAM, AND RECORDING MEDIUM

TECHNICAL FIELD

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

BACKGROUND ART

[0002] In various fields, personal authentication by face image analysis (hereinafter, referred to as face authentication) is used. In the face authentication, a face image of a registered person is stored in advance as a master face image, a face image of a subject obtained in live as a query face image is collated with the master face image, and the subject of the image is authenticated when the query face image matches the master face image. Such face authentication makes it possible, for example, to negate the need for arranging a security guard or the like for admission management at an entrance, to improve safety, to reduce labor costs, and the like.

SUMMARY

[0003] However, on the other hand, since no one is attended, a problem arises in that, for example, a face photograph of a registered person is held over a camera to impersonate during face authentication.

[0004] With the foregoing in mind, it is an object of the present disclosure to provide a new face authentication system that can easily prevent impersonation using a face photograph.

[0005] In an aspect, there is provided a face authentication apparatus, comprising:

a storage means for storing determination reference information relating to a positional relationship between a face and a part other than the face in a human skeleton, the determination reference information including information of a reference of a height of an arm during walking;

an image acquisition means for acquiring an image of a subject;

an extraction means for extracting face information and skeleton information from the image;

a position determination means for determining whether a positional relationship between a position of a face based on the extracted face information and a position of a skeleton based on the extracted skeleton information in the image is normal or abnormal based on the determination reference information; and

an output means for outputting that the subject of the image is non-authenticatable when the skeleton information is not extracted by the extraction means and/or when the positional

relationship is determined to be abnormal by the position determination means. In an aspect, there is provided face authentication method, comprising:

acquiring an image of a subject;

extracting face information and skeleton information from the image;

determining whether a positional relationship between a position of a face based on the extracted face information and a position of a skeleton based on the extracted skeleton information in the image is normal or abnormal based on determination reference information, the determination reference information being determination reference information relating to a positional relationship between a face and a part other than the face in a human skeleton and the determination reference information including information of a reference of a height of an arm during walking; and

outputting that the subject of the image is non-authenticatable when the skeleton information is not extracted by the extracting and/or when the positional relationship is determined to be abnormal by the position-determining

The present disclosure provides a face authentication apparatus, including: a storage unit that stores determination reference information relating to a positional relationship between a face and a part other than the face in a human skeleton; an image acquisition unit that acquires an image of a subject; an extraction unit that extracts face information and skeleton information from the image; a position determination unit that determines whether a positional relationship between a position of a face based on the extracted face information and a position of a skeleton based on the extracted skeleton information in the image is normal or abnormal based on the determination reference information; and an output unit that outputs that the subject of the image is non-authenticatable when the skeleton information is not extracted by the extraction unit and/or when the positional

Claims

1. A face authentication apparatus, comprising:

a storage means for storing determination reference information relating to a positional relationship between a face and a part other than the face in a human skeleton, the determination reference information including information of a reference of a height of an arm during walking;

an image acquisition means for acquiring an image of a subject;

an extraction means for extracting face information and skeleton information from the image;

a position determination means for determining whether a positional relationship between a position of a face based on the extracted face information and a position of a skeleton based on the extracted skeleton information in the image is normal or abnormal based on the determination reference information; and

an output means for outputting that the subject of the image is non-authenticatable when the skeleton information is not extracted by the extraction means and/or when the positional relationship is determined to be abnormal by the position determination means.

2. The face authentication apparatus according to claim 1, further comprising:

a face collation means, wherein

the storage means further stores registered face information of a registered person,

the face collation means collates the extracted face information with the registered face information, and

the output means outputs that the subject of the image is authenticated when the extracted face information and the registered face information are determined to be the same person by the face collation means and outputs that the subject of the image is non-authenticatable when the extracted face information and the registered face information are determined not to be the same person by the face collation means.

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

the determination reference information is information relating to a positional relationship between a face and an arm.

4. The face authentication apparatus according to any one of claims 1 to 3, wherein

the image of the subject includes a plurality of time-series images taken over time.

5. The face authentication apparatus according to claim 4, wherein

the output means outputs that the subject of the image is non-authenticatable when the plurality of time-series images taken in a predetermined time includes an image from which the skeleton information is not extracted by the extraction means and/or when the plurality of time-series images taken in a predetermined time includes an image showing the positional relationship that has been determined not to satisfy the determination reference information by the position determination means.

6. A face authentication method, comprising:

acquiring an image of a subject;

extracting face information and skeleton information from the image;

determining whether a positional relationship between a position of a face based on the extracted face information and a position of a skeleton based on the extracted skeleton information in the image is normal or abnormal based on determination reference information, the determination reference information being determination reference information relating to a positional relationship between a face and a part other than the face in a human skeleton and the determination reference information including information of a reference of a height of an arm during walking; and

outputting that the subject of the image is non-authenticatable when the skeleton information is not extracted by the extracting and/or when the positional relationship is determined to be abnormal by the position-determining.

7. The face authentication method according to claim 6, further comprising:

collating the extracted face information with registered face information of a registered person, wherein

the outputting outputs that the subject of the image is authenticated when the extracted face information and the registered face information are determined to be the same person by the face-collating and outputs that the subject of the image is non-authenticatable when the extracted face information and the registered face information are determined not to be the same person by the face-collating.

8. The face authentication method according to claim 6 or 7, wherein

the determination reference information is information relating to a positional relationship between a face and an arm.

9. The face authentication method according to any one of claims 6 to 8, wherein the image of the subject includes a plurality of time-series images taken over time.

10. A computer readable recording medium with a program for a computer to execute the method according to claim 6 to 9.