

required from a time when a ticket is handed to the control of the gate is a time period in which walking is restricted for the authentication target or a next authentication target behind the authentication target. Even if this time is shortened according to the invention in PTL 1, the time is not zero. Therefore, a stagnation of a flow of persons may occur.

[0008] In the iris authentication system described in PTL 2, although the result is notified in the result notification area, a configuration is not described that associates authentication results for a large number of authentication targets with an authentication result to be notified to a person who enters the result notification area. Therefore, in a case where the plurality of authentication targets exists, it is not certain that the iris authentication system can correctly notify the authentication target of the authentication result. For conviction of the authentication target such that the collation result indicated in the result notification area is shown to the authentication target, it is necessary that only one authentication target exists in the result notification area. In a case of congestion, it is necessary to narrow the result notification area or control access to the result notification area, and as a result, this may cause a non-smooth flow of persons. In a case where content of the notification is content that requires time to be understood, there is a possibility that the authentication target stops.

[0009] One of an object of the disclosure is to provide a system, a method, or the like that contributes to more reliably and smoothly provide information regarding an authentication result to an authenticated person.

[Solution to Problem]

[0010] An information provision system according to one aspect of the

disclosure includes authentication means for authenticating an authentication target using an image obtained by imaging the authentication target to be authenticated, determination means for determining a transmission destination of information regarding a result of the authentication to notify the authentication target of the result of the authentication according to information regarding the authentication target or a situation of the authentication target, and transmission means for transmitting the information to the determined transmission destination.

10 [0011] An information provision method according to one aspect of the disclosure includes authenticating an authentication target using an image obtained by imaging the authentication target to be authenticated, determining a transmission destination of information regarding a result of the authentication to notify the authentication target of the result of the authentication according to information regarding the authentication target or a situation of the authentication target, and transmitting the information to the determined transmission destination.

[0012] A storage medium according to one aspect of the disclosure stores a program for causing a computer to execute processing including authentication processing for authenticating an authentication target using an image obtained by imaging the authentication target to be authenticated, determination processing for determining a transmission destination of information regarding a result of the authentication to notify the authentication target of the result of the authentication according to information regarding the authentication target or a situation of the authentication target, and transmission processing for transmitting the information to the determined transmission destination.

[Advantageous Effects of Invention]

[0013] According to the present invention, provision of information regarding an authentication result to an authenticated person can be more reliably and smoothly performed.

5 [Brief Description of Drawings]

[0014] Fig. 1 is a block diagram illustrating a configuration of an information provision system according to an example embodiment of the disclosure.

Fig. 2 is a flowchart illustrating a flow of processing of an information provision method according to the example embodiment of the disclosure.

Fig. 3 is a block diagram illustrating an example of a functional configuration of an information processing system to which the present invention is applied.

15 Fig. 4 is a diagram illustrating an example of a scene to which the disclosure is applied.

Fig. 5 is a block diagram illustrating an example of a functional configuration of an information processing system in a case where an information provision control device includes a situation specifying unit.

20 Fig. 6 is a diagram illustrating an example of a situation in which an information provision method using a display that has a plurality of displayable regions is performed.

Fig. 7 is a diagram illustrating an example of a situation in which an information provision method using a projector is performed.

25 Fig. 8 is a diagram illustrating an example of a situation in which an information provision method using a plurality of speakers is performed.

Fig. 9 is a block diagram illustrating an example of a functional configuration of an information processing system that includes a reading device.

Fig. 10 is a block diagram illustrating an example of a functional configuration of an information processing system in a case where an imaging device having a function of a provision device is used.

Fig. 11 is a block diagram illustrating an example of an appearance of an imaging device that has a function of a provision device.

Fig. 12 is a flowchart illustrating a first operation example of the information processing system.

Fig. 13 is a flowchart illustrating a first specific example of provision control processing in the first operation example.

Fig. 14 is a flowchart illustrating a second specific example of the provision control processing in the first operation example.

Fig. 15 is a flowchart illustrating a second operation example of the information processing system.

Fig. 16 is a flowchart illustrating a third operation example of the information processing system.

Fig. 17 is a block diagram illustrating an example of a functional configuration of an information provision control device according to one example embodiment of the disclosure.

Fig. 18 is a flowchart illustrating an example of a flow of an information provision control method according to one example embodiment of the disclosure.

Fig. 19 is a block diagram illustrating an example of hardware configuring each unit according to each example embodiment of the disclosure.

[Example Embodiment]

[0015]

Hereinafter, example embodiments of the disclosure will be described in detail with reference to the drawings.

[0016] First, an outline of an example embodiment of the disclosure will
5 be described.

[0017]

<Configuration>

Fig. 1 is a block diagram illustrating a configuration of an information provision system 10 according to one example embodiment of the disclosure. The information provision system 10 includes an
10 authentication unit 101, a determination unit 102, and a transmission unit 103. The information provision system 10 may be implemented as a single device or may be implemented as a combination of a plurality of devices.

15 [0018]

The authentication unit 101 authenticates an authentication target using an image of the authentication target to be authenticated.

[0019] The determination unit 102 determines a transmission destination of information regarding a result of the authentication by the
20 authentication unit 101 according to information regarding the authentication target or a situation of the authentication target. This information is information used to notify the authentication target of the result of the authentication by the authentication unit 101.

[0020] The transmission unit 103 transmits the information regarding the
25 result of the authentication to the transmission destination determined by the determination unit 102.

[0021]

<Operation> A flow of processing by the information provision system 10 will be described with reference to the flowchart in Fig. 2.

[0022]

First, the authentication unit 101 authenticates an authentication target using an image obtained by imaging the authentication target to be authenticated (step S101).

[0023]

Next, the determination unit 102 determines a transmission destination used to issue a notification to the authentication target according to information regarding the authentication target or a situation of the authentication target (step S102).

[0024]

Then, the transmission unit 103 transmits the information regarding the result of the authentication to the transmission destination determined by the determination unit 102 (step S103).

[0025]

<Effect>

According to the information provision system 10, provision of the information regarding the authentication result to the authentication target can be more reliably and smoothly performed. This is because the determination unit 102 determines the transmission destination according to the information regarding the authentication target or the situation of the authentication target and the transmission unit 103 transmits the information regarding the result of the authentication to the transmission destination.

[0026] <Application Example>

Next, an example of a scene to which the disclosure is

authentication target is not specified as an authentication target, a person who may be an authentication target may be referred to as a “passenger”.
[0031]

The disclosure may be applied to the authentication performed in
5 the scene described above. Hereinafter, an outline of an information processing system 100 to which disclosure is applied will be described.
[0032]

Fig. 3 is a block diagram illustrating a main functional configuration of the information processing system 100. The
10 information processing system 100 includes an imaging device 4, an information provision control system 1, and a provision device 7. In the information processing system 100, a pair of the information provision control system 1 and the provision device 7 is referred to as an information provision system 10b in the present disclosure. The
15 information provision system 10b is related to an example of the information provision system 10.
[0033]

== Imaging Device 4 ==

The imaging device 4 images a direction where the imaging device
20 4 faces so as to generate an image. The image generated by imaging of the imaging device 4 may be a still image or a moving image. The image may be a color image or a grayscale image. Hereinafter, the image acquired by imaging of the imaging device 4 is also referred to as a captured image.

25 [0034]

Fig. 4 is a diagram illustrating an example of a mode of imaging by the imaging device 4. Fig. 4 illustrates an example in which the imaging device 4 images authentication targets who follow a route in line.

[0051] The notification is an example of the information regarding the result of the authentication. The content of the notification is content regarding the result of the authentication on the notification target by the authentication device 11. For example, the notification may be

5 information indicating whether the notification target is authenticated.

The notification may be information indicating a guidance or an instruction to the notification target. For example, the notification content determination unit 211 may determine content that urges the authenticated notification target to proceed as the content of the

10 notification and may determine content that instructs a target who is not authenticated to move to a predetermined area as the content of the notification.

In this way, the notification content determination unit 211 may determine the content including the instruction or the guidance that differs according to whether the notification target is authenticated as the

15 content of the notification. Regarding the notification to the notification target who is not authenticated, the notification content determination unit 211 may determine whether to reauthenticate the notification target, and then, determine the content of the notification on the basis of the determination.

20 [0052]

The transmission destination determination unit 212 determines a transmission destination of the information used for the notification to the notification target. The transmission destination indicates an object, a person, a point, a space, or the like which the information reaches.

25 Although a specific example of the transmission destination is indicated in description of a specific example embodiment to be described later, various objects may be “transmission destinations” according to the example embodiment. For example, a space including the head of the

notification target or the provision device 7 may be a “transmission destination”.

[0053] The provision device control unit 213 controls the provision device 7 that issues a notification to the notification target. A specific example of the content depends on the example embodiment. However, the content that may be controlled by the provision device control unit 213 is, for example, operation or non-operation, a position, a direction, a timing, output content, or the like. The provision device control unit 213 controls the provision device 7 on the basis of information regarding at least the content of the notification determined by the notification content determination unit 211 and the transmission destination determined by the transmission destination determination unit 212. By the control by the provision device control unit 213, the notification target recognizes the notification regarding the result of the authentication from the provision device 7.

[0054] Hereinafter, the information that is sent by the provision device control unit 213 to the provision device 7 and is used to control the provision device 7 is also referred to as “control information”. The control information is an example of the information regarding the result of the authentication.

[0055] <Specific Example Embodiment>

The disclosure can be implemented in various modes.

Hereinafter, some specific example embodiments of the disclosure will be exemplified.

[0056] ·Provision of control according to situation of notification target

The provision device control unit 213 may perform control according to the situation of the notification target.

[0057]

Examples of the situation of the notification target that affects the content of the control includes a position, a posture, a line-of-sight direction, or the like of the notification target.

[0058] After specifying the situation of the notification target, the information provision control device 21 may determine the content of the control to the provision device 7 on the basis of the situation.

Hereinafter, a function unit that specifies the situation of the notification target is described as a situation specifying unit 214. The configuration of the information processing system 100 in a case where the information provision control device 21 includes the situation specifying unit 214 is illustrated in Fig. 5 as an information processing system 100a.

Hereinafter, a reference numeral “21a” is assigned to an information provision control device that includes the situation specifying unit 214. A reference numeral “1a” is assigned to an information provision system that includes the information provision control device 21a, and a reference numeral “10a” is assigned to an information provision control system that includes the information provision control system 1a.

[0059] The situation specifying unit 214 may specify the situation of the notification target, for example, from the captured image. The situation specifying unit 214 may acquire the captured image in which the notification target is imaged from the authentication device 11 and specify the situation of the notification target from the captured image. The situation specifying unit 214 may also acquire information that indicates a position of the notification target in the captured image from the

recognized by only the notification target is set as an irradiation destination, it is possible to prevent the authentic result from being known by a person other than the notification target. The place that can be visually recognized by only the notification target is, for example, the abdomen of the notification target.

[0084][Note]

The above examples are specific examples. If a physical action other than those described above is a physical action that can be perceived by the notification target, the physical action may be provided to the notification target by the provision device 7. Regardless of what is provided, the transmission destination determination unit 212 determines a provision range of those provided, and it is sufficient for the provision device control unit 213 to control the provision device 7 so as to provide those to be provided to the determined range.

[0085] [Sixth Specific Example]

In a case where there is a premise that the notification target holds a device that has a function for issuing a notification when receiving electromagnetic waves representing a notification instruction, the provision device 7 may be a device that emits the electromagnetic waves with a directivity. It is sufficient that the transmission destination determination unit 212 determine a position of the notification target as a provision destination. Then, it is sufficient for the provision device control unit 213 to control the provision device 7 so that the provision device 7 emits electromagnetic waves representing a notification instruction to the provision destination. The notification instruction is an instruction to issue a notification. What kind of electromagnetic waves indicates a notification instruction may be determined in advance.

The fixing unit 43 is a portion fixed to a base.

[0117]

The rotary shaft 44 is a portion that can change the directions of the imaging unit 41 and the display unit 42 by rotation. The provision
5 device control unit 213 may control a direction of the rotation, an angle of the rotation, or the like.

[0118]

According to such a modification, because the direction of the imaging device 4 and the direction of the provision device 7 integrally
10 change with the same power source, a total cost (calculation cost, communication cost, temporal cost, or the like) in a case where both of the direction of the imaging device 4 and the direction of the provision device 7 are controlled is reduced. That is, in a case where the information provision control device 21a controls the direction of the
15 provision device 7, cost to control the direction of the imaging device 4 to acquire the captured image of the authentication target may be reduced. Alternatively, in a case where the information provision control device 21a controls the direction of the imaging device 4 to acquire the captured image of the authentication target, cost to control the direction of the
20 provision device 7 may be reduced.

[0119] <Implementation of Example Embodiment>

According to the specific examples described above, those skilled in the art would understand that the example embodiment according to the disclosure may include example embodiments expressed by the following
25 words.

·An example embodiment in which an information provision control device determines a direction of an output of a provision device according to information regarding a notification target or a situation of

extracts device information associated with the identification information read in step S31, from the possession information. A notification device indicated by the device information is related to the transmission destination.

5 [0158]

In step S37, the provision device control unit 213 transmits information regarding an authentication result on the basis of the device information extracted by the processing in step S36.

[0159] [Note]

10 An order of the processing described above is an example, and an order of processing in each step may be changed or some types of processing may be simultaneously executed in parallel without departing from the idea of the disclosure.

[0160] [Configuration of Information Provision Control Device]

15 In the example embodiment described above, the functional configuration of the information provision control device may be expressed as illustrated in Fig. 18. An information provision control device 20 illustrated in Fig. 18 will be described.

[0161]

20 The information provision control device 20 includes a specification unit 201, an acquisition unit 202, a determination unit 203, and a control unit 204.

[0162] The specification unit 201 specifies a position of an authentication target (in real space) to be authenticated.

25 [0163] The acquisition unit 202 acquires a result of the authentication

may be reversed.

[0168]

The information provision control device 20 is incorporated into the information provision system that authenticates the authentication target and notifies the authentication target of the authentication result in such a way that the information provision system can more reliably and smoothly provide information regarding the authentication result to the authenticated person.

[0169] <Hardware Configuration That Implements Each Unit of Example Embodiment>

In each example embodiment of the disclosure described above, a block illustrating each component of each device is illustrated in functional units. However, the blocks illustrating the components do not necessarily mean that the components are configured by separate modules.

[0170] Processing of each component may be achieved, for example, by reading and executing a program that is stored in a computer-readable storage medium and causes a computer system to execute the processing by the computer system. The “computer-readable storage medium” is, for example, a portable medium such as an optical disk, a magnetic disk, a magneto-optical disk, or a nonvolatile semiconductor memory and a storage device such as a read only memory (ROM), a hard disk, or the like built in a computer system. The “computer-readable storage medium” includes a storage medium that can temporarily hold a program such as a volatile memory in the computer system and a storage medium that transmits a program such as a communication line such as a network or a telephone line. The program may implement a part of the above-described functions or may implement the functions described above by a

notification, based on the specified position; and

controlling the output device to output the notification to the determined range.

[Supplementary Note 33]

5 A computer-readable storage medium that stores a program for causing a computer to execute processing including:

specification processing for specifying a position of an authentication target to be authenticated;

acquisition processing for acquiring a result of authentication from authentication means that authenticates the authentication target;

determination processing for determining a range to which an output device that outputs a notification regarding the result of the authentication outputs the notification, based on the specified position; and control processing for controlling the output device to output the notification to the determined range.

[0178]

The disclosure is not limited to these example embodiments. It will be understood by those of ordinary skill in the art that various changes in form and details may be made therein without departing from the spirit and scope of the disclosure as defined by the claims.

[Reference signs List]

[0179]1 information provision control system

100, 100a to 100c information processing system

4 imaging device

25 7 provision device

7a display

7b projector

[Document Name] CLAIMS

[Claim 1] An information provision system comprising:

authentication means for authenticating an authentication target
using an image obtained by imaging the authentication target to be
5 authenticated;

determination means for determining a transmission destination of
information regarding a result of the authentication to notify the
authentication target of the result of the authentication according to
information regarding the authentication target or a situation of the
10 authentication target; and

transmission means for transmitting the information to the
determined transmission destination.

[Claim 2]

The information provision system according to claim 1, further
15 comprising:

situation specification means for specifying a position of the
authentication target in a real space from an image in which the
authentication target is imaged as a situation of the authentication target,
wherein

20 the determination means determines the transmission destination in
such a way that the notification is recognized at the position of the
authentication target in the real space.

[Claim 3]

The information provision system according to claim 2, wherein
25 the determination means determines a region based on the position
of the authentication target in the real space as the transmission
destination, and

the transmission means transmits the notification toward the region
as the information using an output device having a directivity.

[Claim 4] The information provision system according to claim 3,
wherein

the output device is a display, and

the transmission means transmits the notification toward the region

5 by making the output device output a video after controlling at least one
of a position and a direction of the output device.

[Claim 5]

The information provision system according to claim 3, wherein

the output device is a directional speaker, and

10 the transmission means transmits the notification toward the region
by making the output device output audio after controlling at least one of
a position and a direction of the output device.

[Claim 6]

The information provision system according to claim 4 or 5,

15 wherein

for the single authentication target,

the situation specification means repeatedly specifies the position
of the authentication target,

the determination means repeatedly determines the transmission

20 destination, and

the transmission means changes a direction of an output by the
output device according to a movement of the authentication target by
repeatedly controlling at least one of the position and the direction of the
output device based on the transmission destination.

25 [Claim 7] The information provision system according to claim 2,
wherein the determination means determines one of an output device
from among a plurality of output devices based on the position of the
authentication target in the real space, and

the transmission means transmits the information including an instruction to output the notification to the determined output device.

[Claim 8] The information provision system according to claim 1, further comprising:

5 storage means for storing possession information in which personal information of the authentication target and device information of a device owned by the authentication target are associated with each other, wherein

the authentication means specifies the personal information of the authentication target by the authentication,

the determination means acquires the device information associated with the specified personal information from the possession information and determines a device indicated by the device information as the transmission destination, and

15 the transmission means instructs to issue a notification to the transmission destination based on the acquired device information.

[Claim 9]

The information provision system according to claim 1, further comprising:

20 storage means for storing possession information in which identification information of the authentication target and device information of a device owned by the authentication target are associated with each other, wherein

the information provision system receives the identification information of the authentication target that has been read by a reading device and is recorded in an integrated circuit (IC) card held by the authentication target from the reading device that reads information from the IC card,

the authentication means specifies the authentication target whose identification information has been read from the image and authenticates the specified authentication target,

the determination means acquires the device information
5 associated with the identification information of the authentication target and determines a device indicated by the device information as the transmission destination, and

the transmission means instructs to issue a notification to the transmission destination based on the acquired device information.

10 [Claim 10]

The information provision system according to claim 1, further comprising:

storage means for storing feature information in which a feature of an article is associated with device information of a notification device
15 distributed together with the article regarding the notification device that has a function for issuing a notification and a plurality of the articles distributed to the authentication target, wherein

the determination means acquires the device information associated with the article held by the authentication target based on an
20 image of the authentication target who holds the article, and determines the notification device indicated by the device information as the transmission destination, and

the transmission means instructs to issue a notification to the transmission destination based on the acquired device information.

25 [Claim 11] An information provision method comprising:

authenticating an authentication target using an image obtained by imaging the authentication target to be authenticated;

determining a transmission destination of information regarding a

result of the authentication to notify the authentication target of the result of the authentication according to information regarding the authentication target or a situation of the authentication target; and transmitting the information to the determined transmission destination.

[Claim 12]

A non-transitory computer-readable storage medium that stores a program for causing a computer to execute processing comprising:

authentication processing for authenticating an authentication target using an image obtained by imaging the authentication target to be authenticated;

determination processing for determining a transmission destination of information regarding a result of the authentication to notify the authentication target of the result of the authentication according to information regarding the authentication target or a situation of the authentication target; and

transmission processing for transmitting the information to the determined transmission destination.

[Claim 13]

An information provision control device comprising:

specification means for specifying a position of an authentication target to be authenticated;

acquisition means for acquiring a result of authentication from

authentication means that authenticates the authentication target;

determination means for determining a range to which an output device that outputs a notification regarding the result of the authentication outputs the notification, based on the specified position; and

control means for controlling the output device to output the notification to the determined range.

[Claim 14]

An information provision control method comprising:

5 specifying a position of an authentication target to be authenticated; acquiring a result of authentication from authentication means that authenticates the authentication target;

determining a range to which an output device that outputs a notification regarding the result of the authentication outputs the
10 notification, based on the specified position; and

controlling the output device to output the notification to the determined range.

[Claim 15] A non-transitory computer-readable storage medium that stores a program for causing a computer to execute processing

15 comprising:

specification processing for specifying a position of an authentication target to be authenticated;

acquisition processing for acquiring a result of authentication from authentication means that authenticates the authentication target;

20 determination processing for determining a range to which an output device that outputs a notification regarding the result of the authentication outputs the notification, based on the specified position; and

control processing for controlling the output device to output the
25 notification to the determined range.