

DESCRIPTION

Title of Invention: IMAGING UNIT, INFORMATION PROCESSING
DEVICE, PASSAGE MANAGEMENT SYSTEM, INFORMATION
PROCESSING METHOD, AND RECORDING MEDIUM

5 Technical Field

[0001]

The present disclosure relates to an imaging unit, an information processing device, a passage management system, an information processing method, and a recording medium.

10 Background Art

[0002]

It is known to use face authentication in a passage management system.

[0003]

15 For example, PTL 1 discloses a passage management system including an information processing device that captures, by a camera, an imaging range including a face of a person entering a gate and performs face authentication processing on the captured image.

Citation List

20 Patent Literature

[0004]

PTL 1: JP 2023-75227 A

Summary of Invention

Technical Problem

25 [0005]

The passage management system disclosed in PTL 1 captures, by a camera, an imaging range including a face of a person entering a gate, performs face authentication processing on the captured image, and performs passage management of the person with respect to the gate.

However, the user may have difficulty grasping the camera position at the time of entering the gate. As a result, the user may direct the gaze in a direction not expected by the passage management system.
[0006]

5 An object of the present disclosure is to provide an imaging unit, an information processing device, a passage management system, an information processing method, and a recording medium that solve the above-described problem.

Solution to Problem

10 [0007]

 An imaging unit of the present disclosure includes a camera provided in a gate having a door that opens and closes based on a result of authentication of a face image of an entering user and a guide member provided with the door, the camera capturing the face image, a housing
15 attached to the guide member and housing the camera, and a light-emitting member located at at least a part around the camera and capable of emitting light according to a state of the authentication.

[0008]

 An information processing device of the present disclosure
20 includes lighting instruction means for causing, according to a state of authentication, a light-emitting member of an imaging unit to emit light, the imaging unit including a camera provided in a gate having a door that opens and closes based on a result of the authentication of a face image of an entering user and a guide member provided with the door, the camera
25 capturing the face image, a housing attached to the guide member and housing the camera, and the light-emitting member that is located at at least a part around the camera, and authentication means for performing the authentication.

[0009]

An information processing method of the present disclosure includes causing, during waiting for authentication, a light-emitting member located at at least a part around a camera that captures a face image of an entering user and capable of emitting light according to a state of the authentication of the face image to emit light, and performing the authentication based on the face image.

[0010]

A recording medium of the present disclosure records a program for causing a computer to function as lighting instruction means for causing, during waiting for authentication, a light-emitting member located at at least a part around a camera that captures a face image of an entering user and capable of emitting light according to a state of the authentication of the face image to emit light, and authentication means for performing the authentication based on the face image.

Advantageous Effects of Invention

[0011]

According to the imaging unit, the information processing device, the passage management system, the information processing method, and the recording medium of the present disclosure, the user can easily grasp the camera position at the time of entering the gate.

Brief Description of Drawings

[0012]

[Fig. 1] It is a schematic diagram illustrating an example of a configuration of a passage management system according to the present disclosure.

[Fig. 2] It is a perspective view illustrating an example of a configuration of the passage management system according to the present disclosure.

[Fig. 3] It is a plan view I illustrating an example of a

configuration of the passage management system according to the present disclosure.

[Fig. 4] It is an enlarged view of a part A of Fig. 2.

[Fig. 5] It is a view I illustrating an example of a configuration of
5 an imaging unit according to the present disclosure.

[Fig. 6] It is a view I illustrating an example of an internal configuration of the imaging unit according to the present disclosure.

[Fig. 7] It is a plan view II illustrating an example of a configuration of the passage management system according to the present
10 disclosure.

[Fig. 8] It is a side view illustrating an example of an attachment position of a light-emitting member included in the imaging unit according to the present disclosure.

[Fig. 9] It is a sectional view I illustrating an example of an
15 attachment position of the light-emitting member included in the imaging unit according to the present disclosure.

[Fig. 10] It is a view I illustrating an example of a region included in a housing of the imaging unit according to the present disclosure.

[Fig. 11] It is a flowchart I illustrating an example of processing
20 of an information processing method according to the present disclosure.

[Fig. 12] It is a view II illustrating an example of an internal configuration of the imaging unit according to the present disclosure.

[Fig. 13] It is a view II illustrating an example of a region included in the housing of the imaging unit according to the present
25 disclosure.

[Fig. 14] It is a view III illustrating an example of a region included in the housing of the imaging unit according to the present disclosure.

[Fig. 15] It is a view III illustrating an example of an internal

configuration of the imaging unit according to the present disclosure.

[Fig. 16] It is a view I illustrating an example of a layout of the imaging unit in the passage management system according to the present disclosure.

5 [Fig. 17] It is a view II illustrating an example of a layout of the imaging unit in the passage management system according to the present disclosure.

[Fig. 18] It is a diagram illustrating an example of light emission by multiple light-emitting members included in the imaging unit in the
10 passage management system according to the present disclosure.

[Fig. 19] It is a sectional view II illustrating an example of an attachment position of the light-emitting member included in the imaging unit according to the present disclosure.

[Fig. 20] It is a sectional view III illustrating an example of an
15 attachment position of the light-emitting member included in the imaging unit according to the present disclosure.

[Fig. 21] It is a sectional view IV illustrating an example of an attachment position of the light-emitting member included in the imaging unit according to the present disclosure.

20 [Fig. 22] It is a sectional view V illustrating an example of an attachment position of the light-emitting member included in the imaging unit according to the present disclosure.

[Fig. 23] It is a sectional view VI illustrating an example of an attachment position of the light-emitting member included in the imaging
25 unit according to the present disclosure.

[Fig. 24] It is a view II illustrating an example of a configuration of the imaging unit according to the present disclosure.

[Fig. 25] It is a diagram illustrating an example of a configuration of an information processing device according to the present disclosure.

[Fig. 26] It is a flowchart II illustrating an example of processing of the information processing method according to the present disclosure.

[Fig. 27] It is a diagram illustrating an example of a hardware configuration illustrating a configuration of a computer according to the present disclosure.

Example Embodiment

[0013]

Example embodiments according to the present disclosure will be described below with reference to the drawings. The drawings and specific configurations used in the example embodiments shall not be used to interpret the disclosure. In all drawings, the same reference signs are given to the same or related configurations, and common description will be omitted.

In the present disclosure, the drawings are associated with one or more example embodiments.

[0014]

<First Example Embodiment>

An example embodiment according to the present disclosure will be described below with reference to the drawings.

Below, an example of configurations of an imaging unit, an information processing device, and a passage management system in the present disclosure will be described with reference to Figs. 1 to 11.

[0015]

(Configuration of Passage Management System)

A passage management system 10 is used to perform face authentication processing on a face image of a user U and to perform passage management of the user U with respect to a gate 1.

As shown in Fig. 1, the passage management system 10 includes the gate 1, an imaging unit 2, and an information processing device 5.

[0016]

(Configuration of Gate)

The gate 1 performs passage management of the user U by using a door 11 that can be opened and closed.

5 As shown in Figs. 1 to 3, the gate 1 has the door 11 and a guide member 12.

The door 11 opens and closes based on a result of authentication of a face image of an entering user U. During waiting for authentication, the open/closed state of the door 11 is not limited.

10 The door 11 is provided in the guide member 12. For example, in the present disclosure, for example, the door 11 is assumed to be provided in each guide member 12 (a first guide member 12R and a second guide member 12L).

For example, the gate 1 may have the first guide member 12R and the second guide member 12L as the guide member 12. The first guide member 12R and the second guide member 12L face each other. A lane L through which the user U can pass is formed between the first guide member 12R and the second guide member 12L. In the present disclosure, one gate is assumed to form one lane.

20 The first guide member 12R includes the imaging unit 2 as a first imaging unit 2ENT, and the second guide member 12L includes the imaging unit 2 as a second imaging unit 2END.

For simplification of description in the present disclosure, the user U is assumed to pass through the gate 1 in one direction D. In other words, the user U is assumed to enter from the entrance/exit E1 of the gate 1 and exit from the entrance/exit E2 of the gate 1. In a case where the user U enters from the entrance/exit E2 of the gate 1 and exits from the entrance/exit E1 of the gate 1, description will be given with the direction opposite to the direction D being the RD direction. For

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example, the gate 1 may allow a person to pass in both directions.

Further, for simplification of description in the present disclosure, in a case where the user U passes through the gate 1 in one direction D, the first guide member 12R is assumed to be located on the right-hand side of the user U, and the second guide member 12L is assumed to be located on the left-hand side of the user U.

The height of each guide member 12 (the first guide member 12R and the second guide member 12L) is a height at which a face image of the user U can be captured in order to include the imaging unit 2 (the first imaging unit 2ENT and the second imaging unit 2END). As one example, the height of each guide member 12 (the first guide member 12R and the second guide member 12L) is assumed to be equal to or lower than the face position of the user U, but the height is not limited thereto. [0017]

(Configuration of Imaging Unit)

The imaging unit 2 captures a face image of the user U entering the gate 1.

The imaging unit 2 includes a camera 21, a housing 22, and a light-emitting member 23.

The camera 21 is provided in the gate 1.

The housing 22 is attached to the guide member 12 and houses the camera 21. In other words, the camera 21 is attached to the gate 1 via the housing 22. For example, in the present disclosure, the two cameras 21 (the camera 21ENT and the camera 21END) are provided one in each of the guide members 12 (the first guide member 12R and the second guide member 12L). The camera 21ENT included in the first imaging unit 2ENT is provided in the first guide member 12R, and the camera 21END included in the second imaging unit 2END is provided in the second guide member 12L.

The light-emitting member 23 is located at at least a part around the camera 21 and is capable of emitting light according to a state of authentication of the face image. As states of authentication, there are four states: waiting for authentication, execution of authentication, success of authentication, and failure of authentication.

Further, the optical axis of the light-emitting member 23 is directed toward the center side of the housing 22.

[0018]

(Position of Imaging Unit)

As shown again in Fig. 1, the position of the camera 21ENT provided in the first guide member 12R is a position ENT closer to the entrance/exit E2 than the central portion of the guide member 12. The camera 21ENT captures the user U entering the gate 1 from the entrance/exit E1 toward the direction D from the position ENT.

For example, in the present disclosure, the camera 21ENT housed in the housing 22 is assumed to be installed at a position where the user U can be captured from in front of the user U entering the gate 1 from the entrance/exit E1 toward the direction D. For example, as shown in Fig. 3, the camera 21ENT is assumed to capture the user U from the right front of the user U. The camera 21ENT may capture the user U from the left front of the user U.

The position of the camera 21END provided in the second guide member 12L is a position END closer to the entrance/exit E1 than the central portion of the guide member 12. The camera 21END captures, from the position END, a certain user entering the gate 1 from the entrance/exit E2 toward the RD direction (hereinafter, referred to as “user X”).

For example, in the present disclosure, the camera 21END housed in the housing 22 is assumed to be installed at a position where a user can

be captured from in front of the user X entering the gate 1 from the entrance/exit E2 toward the RD direction. For example, the camera 21END is assumed to capture the user X from the right front of the user X entering the gate 1 from the entrance/exit E2 toward the RD direction.

5 The camera 21END may capture the user X from the left front of the user X.

From the above, the direction faced by the camera 21 of the present disclosure is inclined toward the user U (user X) entering the gate 1 relative to the extending direction of the gate 1.

10 [0019]

In Fig. 4 and the following figures, description will be given with the guide member 12 being the first guide member 12R and the imaging unit 2 included in the guide member 12 being the first imaging unit 2ENT. However, the second guide member 12 and the second imaging unit 2END are also assumed to be represented by description similar to that for the

15 first guide member 12R and the first imaging unit 2ENT.

[0020]

(Attachment of Light-Emitting Member)

Fig. 4 is an enlarged view of a part A of Fig. 2.

20 As shown in Fig. 4, the housing 22 is attached to the guide member 12 with a space therebetween.

The light-emitting member 23 is attached to the housing 22 or provided directly below the housing 22. For example, in the present disclosure, the light-emitting member 23 is assumed to be attached to the

25 housing 22.

Light emitted by the light-emitting member 23 attached to the housing 22 is reflected by the guide member 12R and travels toward the user. That is, the gate 1 has a reflecting surface SR that reflects the light emitted by the light-emitting member 23.

[0021]

(Housing)

The housing 22 includes a base portion 221 and a head portion 222.

5 Fig. 5 is a view of the housing 22 shown in Fig. 4, viewed from the side opposite the lane L, that is, from the outside of the first guide member 12R, in a direction intersecting the extending direction of the gate 1. In other words, Fig. 5 is a sectional view in a side view. As shown in Fig. 5, the head portion 222 houses the camera 21.

10 Fig. 6 is a sectional view seen from the upper surface US side of the housing 22. In other words, Fig. 6 is a sectional view in a top view. As shown in Figs. 5 to 6, the housing 22 has a curved surface CS at a corner as viewed from the upper surface US side of the housing 22.

As viewed from the upper surface US side of the housing 22, the
15 base portion 221 has a shape in which the head portion 222 is offset toward the center direction of the housing 22. As viewed from the upper surface US side of the housing 22, because the shape of the base portion 221 is smaller than the shape of the head portion 222, the housing 22 is attached to the guide member 12 with a partial space therebetween.

20 A window portion W is provided in the head portion 222 of the housing 22 at a position facing the lens of the camera 21. The window portion W protects the lens of the camera 21. The window portion W is located in a part of a first region A1 described later.

Further, the direction of the optical axis PD of the camera 21
25 housed in the housing 22 can be changed in accordance with the range of the window portion W. For example, the direction of the optical axis PD may be inclined toward the user U entering the gate 1 relative to the extending direction of the gate 1.

[0022]

(Shape of Light-Emitting Member)

As shown again in Fig. 6, viewed from the upper surface US side of the housing 22, the shape of the light-emitting member 23 is, among shapes obtained by cutting at a cutting plane a continuous shape extending one full turn along the peripheral surface of the housing 22, a shape located on the user side passing through the lane L. The cutting plane here is a plane formed by extending, in a direction perpendicular to the upper surface US, a line extending from the center of the housing 22 along the extending direction of the gate 1. The cross-sectional shape of the light-emitting member 23 is not limited.

As shown in Fig. 7, there may be multiple users (the user U1 and the user U2), and the users may pass through the lanes (the lane L and the lane LL). The gate 1RR further includes the third guide member 12RR adjacent to the first guide member 12R, and the first guide member and the third guide member face each other. A lane LL through which the user U2 can pass is formed between the first guide member 12R and the third guide member 12RR. The camera 21ENTRR provided in the third guide member 12RR captures a face image of the user U2 passing through the lane LL.

In this case, because the shape of the light-emitting member 23 is, among shapes obtained by cutting at a cutting plane a continuous shape extending one full turn along the peripheral surface of the housing 22, a shape located on the user side passing through the lane L, the following advantages are obtained. The user U2 who passes through the lane LL adjacent to the lane L has difficulty seeing light emitted by the light-emitting member 23 of the imaging unit included in the first guide member 12R. In other words, light emitted by the light-emitting member 23 of the imaging unit included in the first guide member 12R is less likely to enter the field of view of the user U2 who passes through the

lane LL adjacent to the lane L. Therefore, the user U2 relatively easily sees light emitted by the light-emitting member 23 of the imaging unit 2 included in the third guide member 12RR. In other words, the user U2 relatively easily notices light emitted by the light-emitting member 23 of the imaging unit 2 included in the third guide member 12RR. In this manner, the line of sight of the entering user is less likely to be directed in an erroneous direction.

[0023]

(Positional Relationship of Light-Emitting Member)

As shown again in Fig. 6, the position of the light-emitting member 23 overlaps the housing 22 in the direction D and a direction orthogonal to the direction D as viewed from the upper surface US side of the housing 22. In this case, the position of the reflecting surface SR overlaps the housing 22 in the direction D and a direction orthogonal to the direction D as viewed from the upper surface US side of the housing 22.

Fig. 8 is a side view of the housing 22 illustrating an example of an attachment position of the light-emitting member 23, and Fig. 9 is a sectional view of the housing 22 to which the light-emitting member 23 is attached. In the state shown in Fig. 8, the position of the light-emitting member 23 overlaps the housing 22 in the vertical direction as viewed from the side of the housing 22. A side view of the housing 22 is assumed to indicate the housing 22 viewed from the extending direction of the gate 1. Fig. 9 is also a view seen from the same direction as Fig. 8.

As shown in Figs. 8 and 9, the optical axis of reflected light at the reflecting surface SR is directed toward the center side of the housing 22.

[0024]

In describing light-emitting portions of the light-emitting member 23, “regions included in the housing 22” will be described in detail with

reference to Fig. 10.

[0025]

The housing 22 has, at at least a part around the camera, a first region A1 and a second region A2 aligned with the first region A1 in the extending direction of the gate 1. The first region A1 is on the lens side of the camera 21 relative to the second region A2.

The housing 22 may further have, at at least a part around the camera, a third region A3 aligned with the first region A1 in a direction intersecting the extending direction of the gate 1.

The first region A1 is on the user U side passing through the lane L relative to the third region A3. The first region A1, the second region A2, and the third region A3 are regions along the peripheral surface of the housing 22.

[0026]

(Light Emission Pattern of Light-Emitting Member)

During waiting for authentication, the light-emitting member 23 is capable of emitting light only in the first region A1 out of the first region A1 and the second region A2. Further, the light-emitting member 23 may also be capable of emitting light only in the first region A1 out of the first region A1 and the third region A3.

In the case of the light-emitting member 23 shown in Fig. 6, the light-emitting member 23 emits light at a light-emitting portion related to the first region A1 on the lens side of the camera 21.

Among the optical axis of the light-emitting member 23 in the first region A1 and the optical axis of the light-emitting member 23 in the second region A2, only the optical axis of the light-emitting member in the first region A1 may be directed toward the center side of the housing 22.

[0027]

In a case of failure of authentication, the light-emitting member 23 is capable of emitting light in the first region A1 and the second region A2. At the time of failure of authentication, the door 11 becomes closed and restricts the user U from exiting from the gate 1.

5 In the case of the light-emitting member 23 shown in Fig. 6, the light-emitting member 23 emits light at light-emitting portions related to the first region A1 and the second region A2.

[0028]

In a case of success of authentication, the light-emitting member
10 23 emits light sequentially from the first region A1 to the second region A2 in the first region A1 and the second region A2. As a result, the light-emitting member 23 prompts the user U to exit from the gate 1. At the time of success of authentication, the door 11 becomes open and allows the user U to exit from the gate 1.

15 [0029]

The light-emitting member 23 may blink during execution of authentication. At that time, no limitation is imposed on a region such as the first region A1 and the second region A2. Due to the blinking, the gaze of the user U is less likely to move away from the imaging unit 2,
20 and therefore the result of the next authentication (success or failure of authentication) becomes easier to convey, and subsequent behavior of the user U becomes easier to prompt.

[0030]

(Information Processing Device)

25 The information processing device 5 performs authentication of the face image of the user U and causes the light-emitting member of the imaging unit to emit light according to the state of authentication.

As shown again in Fig. 1, the information processing device 5 includes lighting instruction means 51, authentication means 52, and

authentication data acquisition means 53.

Operation of each unit in the information processing device 5 described below is related to at least a part of the information processing method of the present disclosure.

5 [0031]

(Lighting Instruction Means)

The lighting instruction means 51 causes the light-emitting member of the imaging unit to emit light according to the state of authentication by the authentication means 52. A connection method
10 between the imaging unit 2 and the lighting instruction means 51 may be either wired or wireless.

The imaging unit that communicates with the information processing device 5 is provided in a gate having a door that opens and closes based on a result of authentication of a face image of an entering
15 user and a guide member provided with the door, and includes a camera that captures the face image, a housing that is attached to the guide member and houses the camera, and a light-emitting member that is located at at least a part around the camera. In the present disclosure, the imaging unit including the light-emitting member that the information
20 processing device 5 causes to emit light is the imaging unit 2.

[0032]

The housing included in the imaging unit that communicates with the information processing device 5 is assumed to have, at at least a part around the camera, a first region and a second region aligned with the
25 first region in the extending direction of the gate, and the first region is on the lens side of the camera relative to the second region.

In this case, the lighting instruction means 51 may cause the light-emitting member to emit light only in the first region out of the first region and the second region during waiting for authentication by the

authentication means 52.

The lighting instruction means 51 may cause the light-emitting member to emit light in the first region and the second region in a case of failure of authentication.

5 [0033]

(Authentication Means)

The authentication means 52 receives the face image captured by the imaging unit 2 and performs authentication of the face image depending on whether the face image matches the registration information
10 acquired by the authentication data acquisition means 53. A connection method between the imaging unit 2 and the authentication means 52 may be either wired or wireless.

According to the state of authentication by the authentication means 52, the lighting instruction means 51 causes the light-emitting
15 member of the imaging unit to emit light.

[0034]

(Authentication Data Acquisition Means)

The authentication data acquisition means 53 acquires registration information from a server 7 via a network 6. For example, the
20 registration information is a face image of a user permitted to pass through the gate 1, or information indicating feature points of the face image of the user extracted from the face image.

The authentication data acquisition means 53 may acquire registration information stored in storage means included in the
25 information processing device 5. In other words, the information processing device 5 may hold the registration information.

[0035]

(Information Processing Method)

The information processing method of the information processing

device 5 in the present example embodiment will be described.

A manufacturing method of the present example embodiment is carried out according to the flow shown in Fig. 11.

[0036]

5 First, the information processing device 5 determines whether the state of authentication by the authentication means 52 is waiting for authentication (step ST101).

In a case where the state is waiting for authentication (step ST101:YES), the lighting instruction means 51 of the information
10 processing device 5 causes the light-emitting member 23 to emit light in light emission pattern 1 (step ST105).

In light emission pattern 1, the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to emit light only in the first region A1 out of the first region A1 and the
15 second region A2 that the housing 22 included in the imaging unit 2 has.

In a case where the state is not the waiting state (step ST101:NO), the process proceeds to the next process.

[0037]

Next, the information processing device 5 determines whether the
20 state of authentication by the authentication means 52 is execution of authentication (step ST102).

In a case where the state is execution of authentication (step ST102:YES), the lighting instruction means 51 of the information
processing device 5 causes the light-emitting member 23 to emit light in
25 light emission pattern 2 (step ST106).

In light emission pattern 2, the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to blink. At that time, no limitation is imposed on a region such as the first region A1 and the second region A2.

In a case where the state is not the waiting state (step ST102:NO), the process proceeds to the next process.

[0038]

5 Next, the information processing device 5 determines whether the state of authentication by the authentication means 52 is success of authentication (step ST103).

 In a case where the state is success of authentication (step ST103:YES), the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to emit light in
10 light emission pattern 3 (step ST107).

 In light emission pattern 3, the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to emit light sequentially from the first region A1 to the second region A2 in the first region A1 and the second region A2.

15 [0039]

 In a case where the state is not success (step ST103:NO), that is, in a case of failure of authentication, the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to emit light in light emission pattern 4 (step ST104).

20 In light emission pattern 4, the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to emit light in the first region A1 and the second region A2.

[0040]

 As described above, the lighting instruction means 51 of the information processing device 5 causes the light-emitting member 23 to
25 emit light according to the state of authentication. (End)

[0041]

(Operation and Effects)

 According to the imaging unit 2 of the present disclosure, the

light-emitting member 23 located at at least a part around the camera 21 housed in the housing 22 is capable of emitting light according to the state of authentication of the face image of the user U entering the gate 1.

As a result, the user can easily grasp the position of the camera 21
5 by relying on light emission of the light-emitting member 23.

Accordingly, in the imaging unit according to the present disclosure, the user can easily grasp the camera position at the time of entering the gate.

[0042]

10 (Operation and Effects)

According to the information processing device 5 of the present disclosure, the imaging unit that communicates with the information processing device 5 includes a light-emitting member located at at least a part around the camera housed in the housing. The light-emitting
15 member is caused to emit light by the lighting instruction means according to the state of authentication of the face image of the user entering the gate.

As a result, the user can easily grasp the position of the camera by relying on light emitted by the lighting instruction means 51.

20 Accordingly, in the information processing device according to the present disclosure, the user can easily grasp the camera position at the time of entering the gate.

[0043]

Further, the imaging unit of the present disclosure can achieve the
25 following effects by “being provided in the gate 1 having the door 11 that opens and closes based on a result of authentication of a face image of an entering user U and the guide member 12 provided with the door 11, and including the camera 21 that captures the face image, a housing 22 that is attached to the guide member 12 and houses the camera 21, and a light-

emitting member 23 that is located at at least a part around the camera 21 and is capable of emitting light according to a state of authentication”.

According to the imaging unit 2 of the present disclosure, the light-emitting member 23 located at at least a part around the camera 21
5 housed in the housing 22 is capable of emitting light according to the state of authentication of the face image of the user U entering the gate 1.

As a result, the user can easily grasp the position of the camera 21 by relying on light emission of the light-emitting member 23.

Accordingly, in the imaging unit according to the present
10 disclosure, the user can easily grasp the camera position at the time of entering the gate.

[0044]

In addition, in the imaging unit of the present disclosure, an effect that “the user U can more easily grasp the position of the camera 21 by
15 relying on light emission of the light-emitting member 23” can also be obtained by further providing that “light emitted by the light-emitting member 23 travels toward the user U”.

[0045]

In addition, in the imaging unit of the present disclosure, an effect
20 that “the user U can more easily grasp the position of the camera 21 by relying on light emission of the light-emitting member 23” can also be obtained by further providing that “the light-emitting member 23 is attached to the housing 22 or provided directly below the housing”.

[0046]

25 In addition, in the imaging unit of the present disclosure, by further providing that “the housing 22 is attached to the guide member 12 with a space therebetween, and light emitted by the light-emitting member 23 travels toward the user through the space”, influence of the light emitted by the light-emitting member 23 on the user U can be reduced.

In other words, an effect of reducing glare felt by the user U can also be obtained.

[0047]

In addition, in the imaging unit of the present disclosure, an effect
5 that “the user U can more easily grasp the position of the camera 21 by
relying on light emission of the light-emitting member 23” can also be
obtained by further providing that “the housing 22 has, at at least a part
around the camera 21, a first region A1 and a second region A2 aligned
with the first region A1 in the extending direction of the gate 1, the first
10 region A1 is on the lens side of the camera 21 relative to the second
region A2, and the light-emitting member 23 is capable of emitting light
only in the first region A1 out of the first region A1 and the second region
A2 during waiting for authentication”.

[0048]

15 In addition, in the imaging unit of the present disclosure, an effect
that “because the first region A1 is on the user U side relative to the third
region A3, the user U2 entering the gate adjacent to the user U1 entering
the gate 1 is less likely to misidentify the position of the camera 21” can
also be obtained by further providing that “the direction faced by the
20 camera 21 is inclined toward the user U entering the gate 1 relative to the
extending direction of the gate 1, the housing 22 has, at at least a part
around the camera 21, a third region A3 aligned with the first region A1 in
a direction intersecting the extending direction of the gate 1, the first
region A1 is on the user U side relative to the third region A3, and the
25 light-emitting member 23 is capable of emitting light only in the first
region A1 out of the first region A1 and the third region A3”.

[0049]

In addition, in the imaging unit of the present disclosure, an effect
that “people around the gate 1 can also be more easily notified of failure

of authentication” can also be obtained by further providing that “the light-emitting member 23 is capable of emitting light in the first region A1 and the second region A2 in a case of failure of authentication”.

Further, in a case where the gate 1 allows passage in the direction D and the RD direction, because the second region A2 emits light, failure of authentication also becomes easier to notify to the user X attempting to enter the gate 1 from the opposite direction.

[0050]

In addition, in the imaging unit of the present disclosure, by further providing that “the optical axis of the light-emitting member 23 is directed toward the center side of the housing 22”, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0051]

In addition, in the imaging unit of the present disclosure, by further providing that “the housing 22 has, at at least a part around the camera 21, a first region A1 and a second region A2 aligned with the first region A1 in the extending direction of the gate 1, the first region A1 is on the lens side of the camera 21 relative to the second region A2, and, among the optical axis of the light-emitting member 23 in the first region A1 and the optical axis of the light-emitting member 23 in the second region A2, only the optical axis of the light-emitting member 23 in the first region A1 is directed toward the center side of the housing 22”, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0052]

In addition, in the imaging unit of the present disclosure, by

further providing that “the housing 22 or the gate 1 has a reflecting surface SR that reflects light emitted by the light-emitting member 23, and the position of the reflecting surface SR overlaps the housing 22 as viewed from the upper surface US side of the housing 22”, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0053]

In addition, in the imaging unit of the present disclosure, by further providing that “the optical axis of reflected light at the reflecting surface SR is directed toward the center side of the housing 22”, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0054]

In addition, in the imaging unit of the present disclosure, by further providing that “the position of the light-emitting member 23 overlaps the housing 22 as viewed from the upper surface US side of the housing 22”, an effect that “the imaging unit can be more easily downsized compared with a case where the position of the light-emitting member 23 is on the outer peripheral surface of the housing 22 as viewed from the upper surface US side of the housing 22” can also be obtained. Further, by providing that “the position of the light-emitting member 23 overlaps the housing 22 as viewed from the upper surface US side of the housing 22”, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0055]

In addition, in the imaging unit of the present disclosure, by

further providing that “the position of the light-emitting member 23 overlaps the housing 22 or the gate 1 as viewed from the side of the housing 22”, an effect that “the imaging unit can be more easily downsized compared with a case where the position of the light-emitting member 23 is on the outer peripheral surface of the housing 22 as viewed from the side of the housing 22” can also be obtained.

[0056]

In addition, in the imaging unit of the present disclosure, by further providing that “the housing 22 has a curved surface CS at a corner as viewed from the upper surface US side of the housing 22”, an effect that “when the user U or baggage carried by the user U collides with the housing 22, force due to the collision can be more easily deflected” can also be obtained.

[0057]

<Modification>

The shape of the light-emitting member 23 may also be, as shown in Fig. 12, a shape having light-emitting portions in the first region A1, the second region A2, and the third region A3 of the above disclosure. For example, as shown in Figs. 12 to 13, the direction faced by the camera 21 is assumed to be along the extending direction of the gate 1. In this case, the imaging range becomes wider than in a case where the direction faced by the camera 21 in the above disclosure is inclined toward the user entering the gate 1.

Accordingly, in accordance with the imaging range, as shown in Fig. 13, the first region A1 may be a wider first region A1INST.

Further, as shown in Fig. 14, the second region A2 may be a wider second region A2INST. Because the second region A2 becomes wider, at the time of failure of authentication, a larger number of people around the gate 1 can be more easily notified of failure of authentication.

[0058]

<Modification>

The light-emitting member 23 may have a configuration in which a part overlaps the housing 22 in the direction D and a direction orthogonal to the direction D as viewed from the upper surface US side of the housing 22. Even in that case, downsizing can be achieved compared with a configuration in which the entirety of the light-emitting member 23 does not overlap in the direction D and a direction orthogonal to the direction D as viewed from the upper surface US side of the housing 22.

10 [0059]

The light-emitting member 23 may have a configuration in which a part overlaps the housing 22 in the vertical direction as viewed from the side of the housing 22. Even in that case, downsizing can be achieved compared with a configuration in which the entirety of the light-emitting member 23 does not overlap the housing 22 in the vertical direction as viewed from the side of the housing 22.

[0060]

The optical axis of the light-emitting member 23 may not be directed toward the center side of the housing 22. For example, the optical axis of the light-emitting member 23 may be directed in the vertical direction, or may be directed toward the outside of the housing 22. Even in this case, by direct light or reflected light at the reflecting surface SR, the user can easily grasp the position of the camera 21.

Further, even in a case where the optical axis of the light-emitting member 23 is not directed toward the center side of the housing 22, when notification is given to the user by reflected light at the reflecting surface SR, glare to the user can also be reduced compared with direct light. Further, even if the optical axis of the light-emitting member 23 is not directed toward the center side of the housing 22, because the position of

the reflecting surface SR overlaps the housing 22 as viewed from the upper surface US side of the housing 22, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0061]

The light-emitting member 23 is not limited to a configuration that emits directional light. In other words, the light-emitting member 23 may emit diffused light. Even in that case, by direct light or reflected light at the reflecting surface SR, the user can easily grasp the position of the camera 21. Further, even in a case where the light-emitting member 23 emits diffused light, when notification is given to the user by reflected light at the reflecting surface SR, glare to the user can also be reduced compared with direct light. Further, even in a case where the light-emitting member 23 does not emit directional light, because the light-emitting member 23 overlaps the housing 22 as viewed from the upper surface US side of the housing 22, influence on the camera 21 by light emitted by the light-emitting member 23 can be reduced, and an effect that “flare occurring in the face image can be more easily suppressed” can also be obtained.

[0062]

The shape of the light-emitting member 23 may also be a shape as shown in Fig. 15. For example, the shape of the light-emitting member 23 may be a continuous shape extending one full turn along the peripheral surface of the housing 22 as viewed from the upper surface US side of the housing 22.

In this case, light-emitting portions of the light-emitting member 23 may be changeable. Because the light-emitting portions of the light-emitting member 23 are changeable, the arrangement of each imaging unit

2 shown in Fig. 16 can be changed to the arrangement of Fig. 17. When the arrangement of each imaging unit 2 is changed, the direction of the optical axis PD of the camera 21 housed in the housing 22 may be changed as appropriate. The window portion W provided in the head
5 portion 222 of the housing 22 may extend over a part of the first region A1 and a part of the second region A2.

[0063]

The gate 1 may have one guide member 12, and the openable/closable door 11 may be provided in the one guide member 12.
10 In this case, a configuration may be conceived in which the gate 1 is configured by one guide member and a side wall portion of a predetermined height.

[0064]

The gate 1 may have one guide member 12, and the one guide
15 member 12 may include multiple imaging units 2.

[0065]

The one guide member may also include the two imaging units 2 (the first imaging unit 2ENT and the second imaging unit 2END).

[0066]

20 For example, in the passage management system 10, the housing 22 and the gate 1 may be colored in a first color, and the light-emitting member 23 may emit light in a second color different from the first color. As a result, the user U can easily grasp the position of the imaging unit 2 including the light-emitting member 23 at the time of entering the gate 1.

25 [0067]

For example, in the passage management system 10, the color of the door 11 may change to a color in the same color family as the color of the light-emitting member 23. As a result, the user U can easily grasp the state of authentication.

[0068]

For example, the passage management system 10 may be applied to a fare payment gate of public transportation such as a train.

[0069]

5 In the passage management system 10, the gate 1 may have, as the guide member 12, the first guide member 12R and the second guide member 12L, the first guide member 12R may include the imaging unit 2 as the first imaging unit 2ENT, the second guide member 12L may include the imaging unit 2 as the second imaging unit 2END, and the light-
10 emitting member 23 of the second imaging unit 2END may be capable of emitting light in conjunction with the light-emitting member 23 of the first imaging unit at the time of failure of authentication.

That is, as shown in Fig. 18, at the time of failure of authentication, in addition to light emission of the first imaging unit
15 2ENT that captures from the entrance/exit E1 toward the direction D, the light-emitting member 23 of the second imaging unit that captures from the entrance/exit E2 toward the RD direction may also emit light in conjunction therewith.

As a result, the user U can see the light-emitting member 23
20 included in the imaging unit 2 arranged at a position close to the entrance/exit from which the user U entered, and can easily grasp the state of authentication.

[0070]

For example, as shown in Fig. 19, the position of the light-emitting
25 member 23 may be on the outer peripheral surface of the housing 22 as viewed from the side of the housing 22. In this case, light emitted by the light-emitting member 23 may directly travel toward the user. Further, in this case, the light-emitting member 23 is not limited to a configuration that emits directional light, and the direction of the optical

axis is also not limited. In other words, a configuration that emits diffused light may also be used. Further, the optical axis of the light-emitting member 23 may not be directed toward the center side of the housing 22. Fig. 19 shows, as one example, a configuration in which the optical axis is directed toward the center side of the housing 22.

[0071]

For example, as shown in Fig. 20, the position of the light-emitting member 23 may be on the outer peripheral surface of the housing 22 as viewed from the side of the housing 22, and the imaging unit 2 may have a cover 24 that suppresses diffusion of light emitted by the light-emitting member 23. As a result, dissipation of light emitted by the light-emitting member 23 can be suppressed. Further, in this case, the light-emitting member 23 is not limited to a configuration that emits directional light, and the direction of the optical axis is also not limited. In other words, a configuration that emits diffused light may also be used. Further, the optical axis of the light-emitting member 23 may not be directed toward the center side of the housing 22. Fig. 20 shows, as one example, a configuration in which the optical axis is directed toward the center side of the housing 22.

[0072]

For example, as shown in Fig. 21, the position of the light-emitting member 23 may not overlap the housing 22 as viewed from the side of the housing 22. In other words, the light-emitting member 23 may be located in a space between the housing 22 and the guide member 12 of the gate 1. Further, in this case, the light-emitting member 23 is not limited to a configuration that emits directional light, and the direction of the optical axis is also not limited. In other words, a configuration that emits diffused light may also be used. Further, the optical axis of the light-emitting member 23 may not be directed toward the center side of

the housing 22. Fig. 21 shows, as one example, a configuration in which the optical axis is directed toward the center side of the housing 22.

[0073]

For example, as shown in Fig. 22, the light-emitting member 23
5 may be provided directly below the housing as viewed from the side of the housing 22. For example, the light-emitting member 23 may be provided in the guide member 12 of the gate 1. In this case, the housing 22 has the reflecting surface SR that reflects light emitted by the light-emitting member 23. Further, in this case, the light-emitting member 23 is not
10 limited to a configuration that emits directional light, and the direction of the optical axis is also not limited. In other words, a configuration that emits diffused light may also be used. Further, the optical axis of the light-emitting member 23 may not be directed toward the center side of the housing 22. Fig. 22 shows, as one example, a configuration in which
15 the optical axis is directed toward the center side of the housing 22.

[0074]

For example, as shown in Fig. 23, the position of the light-emitting member 23 may overlap the gate 1 as viewed from the side of the housing 22. In this case, the housing 22 has the reflecting surface SR that
20 reflects light emitted by the light-emitting member 23. Further, in this case, the light-emitting member 23 is not limited to a configuration that emits directional light, and the direction of the optical axis is also not limited. In other words, a configuration that emits diffused light may also be used. Further, the optical axis of the light-emitting member 23
25 may not be directed toward the center side of the housing 22. Fig. 23 shows, as one example, a configuration in which the optical axis is directed toward the center side of the housing 22.

[0075]

The first region A1 may also be present only in linear portions out

of regions along the peripheral surface of the housing 22. In this case, the light-emitting member 23 may have a linear shape as viewed from the upper surface US side of the housing 22.

[0076]

5 <Second Example Embodiment>

An example embodiment according to the present disclosure will be described below with reference to the drawings.

Below, an example of a configuration of the imaging unit in the present disclosure will be described with reference to Fig. 24.

10 [0077]

(Configuration)

An imaging unit 2m is provided in a gate having a door that opens and closes based on a result of authentication of a face image of an entering user and a guide member provided with the door, and includes a camera 21m that captures the face image, a housing 22m that is attached to the guide member and houses the camera 21m, and a light-emitting member 23m that is located at at least a part around the camera 21m and is capable of emitting light according to a state of authentication.

[0078]

20 (Operation and Effects)

According to the imaging unit 2m of the present disclosure, the light-emitting member 23m located at at least a part around the camera 21m housed in the housing 22m is capable of emitting light according to the state of authentication of the face image of the user entering the gate.

25 As a result, the user can easily grasp the position of the camera 21m by relying on light emission of the light-emitting member 23m.

Accordingly, in the imaging unit according to the present disclosure, the user can easily grasp the camera position at the time of entering the gate.

[0079]

<Third Example Embodiment>

An example embodiment according to the present disclosure will be described below with reference to the drawings.

5 Below, an example of a configuration of the information processing device in the present disclosure will be described with reference to Fig. 25.

[0080]

(Configuration)

10 An information processing device 5m includes lighting instruction means 51m for causing, according to the state of authentication, the light-emitting member of an imaging unit to emit light, the imaging unit being provided in a gate having a door that opens and closes based on a result of authentication of a face image of an entering user and a guide member
15 provided with the door and including a camera that captures the face image, a housing that is attached to the guide member and houses the camera, and a light-emitting member that is located at at least a part around the camera, and includes authentication means 52m for performing authentication.

20 [0081]

(Operation and Effects)

 According to the information processing device 5m of the present disclosure, the imaging unit that communicates with the information processing device 5m includes a light-emitting member located at at least
25 a part around the camera housed in the housing. The light-emitting member is caused to emit light by the lighting instruction means 51m according to the state of authentication of the face image of the user entering the gate.

 As a result, the user can easily grasp the position of the camera by

relying on light emitted by the lighting instruction means 51m.

Accordingly, in the information processing device according to the present disclosure, the user can easily grasp the camera position at the time of entering the gate.

5 [0082]

<Fourth Example Embodiment>

An example embodiment according to the present disclosure will be described below with reference to the drawings.

Below, an example of the information processing method in the
10 present disclosure will be described with reference to Fig. 26.

The information processing method in the present disclosure is carried out according to the flow shown in Fig. 26.

[0083]

The information processing method causes, during waiting for
15 authentication, a light-emitting member located at at least a part around a camera that captures a face image of an entering user and capable of emitting light according to the state of authentication of the face image to emit light (step ST10), and performs the authentication based on the face image (step ST20).

20 [0084]

(Operation and Effects)

According to the information processing method of the present disclosure, a light-emitting member located at at least a part around a camera is capable of emitting light according to the state of authentication
25 of a face image of a user entering a gate. Then, the light-emitting member is caused to emit light during waiting for the authentication, and thereafter authentication is performed based on the face image.

As a result, the user can easily grasp the position of the camera by relying on light emission of the light-emitting member.

Accordingly, in the imaging unit according to the present disclosure, the user can easily grasp the camera position at the time of entering the gate.

[0085]

5 While the present disclosure has been particularly shown and described with reference to example embodiments thereof, the present 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
10 and scope of the present disclosure as defined by the claims. And each example embodiment can be appropriately combined with other example embodiments.

[0086]

Fig. 27 is a hardware configuration diagram illustrating a
15 configuration of a computer 1100 according to the present example embodiment. The computer 1100 includes, for example, a processor 1110, a main memory 1120, a storage 1130, and an interface 1140.

[0087]

Each functional unit of the above-described information processing
20 device 5 is implemented in the computer 1100. Then, operation of each functional unit described above is stored in the storage 1130 in the form of a program. The processor 1110 reads the program from the storage 1130, loads the program into the main memory 1120, and executes the above processing in accordance with the program. The processor 1110
25 also secures, in the main memory 1120 in accordance with the program, a storage area used by each functional unit described above.

[0088]

The program may be for implementing a part of functions to be exhibited by the computer 1100. For example, the program may cause

functions to be exhibited by combination with another program already stored in the storage 1130 or by combination with another program implemented in another device. The computer 1100 may also include, in addition to the above configuration or instead of the above configuration, a custom large scale integrated circuit (LSI) such as a programmable logic device (PLD). Examples of the programmable logic device (PLD) include programmable array logic (PAL), generic array logic (GAL), complex programmable logic device (CPLD), and field programmable gate array (FPGA). In this case, a part or all of functions implemented by the processor 1110 may be implemented by the integrated circuit.

[0089]

Examples of the storage 1130 include a magnetic disk, a magneto-optical disk, and a semiconductor memory. The storage 1130 may be an internal medium directly connected to a bus of the computer 1100, or may be an external medium connected to the computer 1100 via the interface 1140 or a communication line. In a case where the program is distributed to the computer 1100 via a communication line, the computer 1100 that receives the distribution may load the program into the main memory 1120 and execute the above processing. The program may also be for implementing a part of the above-described functions. Further, the program may be a so-called difference file (difference program) that implements the above-described functions in combination with another program already stored in the storage 1130.

[0090]

Some or all of the above example embodiments may also be described as the following Supplementary Notes, but the present disclosure is not limited to the following.

[0091]

(Supplementary Note 1)

An imaging unit including:

a camera provided in a gate having a door that opens and closes based on a result of authentication of a face image of an entering user and a guide member provided with the door, the camera capturing the face

5 image;

a housing attached to the guide member and housing the camera;

and

a light-emitting member located at at least a part around the camera and capable of emitting light according to a state of the

10 authentication.

[0092]

(Supplementary Note 2)

The imaging unit according to Supplementary Note 1,

wherein light emitted by the light-emitting member travels toward

15 the user.

[0093]

(Supplementary Note 3)

The imaging unit according to Supplementary Note 1 or 2,

wherein the light-emitting member is attached to the housing or is

20 provided directly below the housing.

[0094]

(Supplementary Note 4)

The imaging unit according to any one of Supplementary Notes 1 to 3, wherein

25 the housing is attached to the guide member with a space, and

light emitted by the light-emitting member travels toward the user through the space.

[0095]

(Supplementary Note 5)

The imaging unit according to any one of Supplementary Notes 1 to 4, wherein

the housing has, at at least a part around the camera, a first region and a second region aligned with the first region in an extending direction of the gate,

the first region is on a lens side of the camera relative to the second region, and

the light-emitting member is capable of emitting light only in the first region out of the first region and the second region during waiting for the authentication.

[0096]

(Supplementary Note 6)

The imaging unit according to Supplementary Note 5, wherein

a direction faced by the camera is inclined toward the user entering the gate relative to the extending direction of the gate,

the housing has, at at least a part around the camera, a third region aligned with the first region in a direction intersecting the extending direction of the gate,

the first region is on the user side relative to the third region, and

the light-emitting member is capable of emitting light only in the first region out of the first region and the third region.

[0097]

(Supplementary Note 7)

The imaging unit according to Supplementary Note 5,

wherein the light-emitting member is capable of emitting light in the first region and the second region in a case of failure of the authentication.

[0098]

(Supplementary Note 8)

The imaging unit according to any one of Supplementary Notes 1 to 4,

wherein an optical axis of the light-emitting member is directed toward a center side of the housing.

5 [0099]

(Supplementary Note 9)

The imaging unit according to Supplementary Note 8, wherein the housing has, at at least a part around the camera, a first region and a second region aligned with the first region in an extending direction
10 of the gate,

the first region is on a lens side of the camera relative to the second region, and

among an optical axis of the light-emitting member in the first region and an optical axis of the light-emitting member in the second
15 region, only the optical axis of the light-emitting member in the first region is directed toward the center side of the housing.

[0100]

(Supplementary Note 10)

The imaging unit according to Supplementary Note 4, wherein
20 the housing or the gate has a reflecting surface that reflects light emitted by the light-emitting member, and

a position of the reflecting surface overlaps the housing as viewed from an upper surface side of the housing.

[0101]

25 (Supplementary Note 11)

The imaging unit according to Supplementary Note 10, wherein an optical axis of reflected light at the reflecting surface is directed toward a center side of the housing.

[0102]

(Supplementary Note 12)

The imaging unit according to Supplementary Note 10, wherein a position of the light-emitting member overlaps the housing as viewed from the upper surface side of the housing.

5 [0103]

(Supplementary Note 13)

The imaging unit according to Supplementary Note 10, wherein the imaging unit has a cover that suppresses diffusion of light emitted by the light-emitting member.

10 [0104]

(Supplementary Note 14)

The imaging unit according to Supplementary Note 10, wherein a position of the light-emitting member overlaps the housing or the gate as viewed from a side of the housing.

15 [0105]

(Supplementary Note 15)

The imaging unit according to any one of Supplementary Notes 1 to 4, wherein

light-emitting portions of the light-emitting member are
20 changeable.

[0106]

(Supplementary Note 16)

The imaging unit according to any one of Supplementary Notes 1 to 4, wherein

25 as viewed from an upper surface side of the housing, the housing has a curved surface at a corner.

[0107]

(Supplementary Note 17)

An information processing device including:

lighting instruction means for causing, according to a state of authentication, a light-emitting member of an imaging unit to emit light,

the imaging unit including:

5 a camera provided in a gate having a door that opens and closes based on a result of the authentication of a face image of an entering user and a guide member provided with the door, the camera capturing the face image;

a housing attached to the guide member and housing the camera; and

10 the light-emitting member located at at least a part around the camera; and

authentication means for performing the authentication.

[0108]

(Supplementary Note 18)

15 The information processing device according to Supplementary Note 17, wherein

the housing has, at at least a part around the camera, a first region and a second region aligned with the first region in an extending direction of the gate,

20 the first region is on a lens side of the camera relative to the second region, and

the lighting instruction means causes the light-emitting member to emit light only in the first region out of the first region and the second region during waiting for the authentication.

25 [0109]

(Supplementary Note 19)

The information processing device according to Supplementary Note 18, wherein

the lighting instruction means causes the light-emitting member to

emit light in the first region and the second region in a case of failure of the authentication.

[0110]

(Supplementary Note 20)

5 A passage management system including:
the information processing device according to any one of
Supplementary Notes 17 to 19;
the imaging unit; and
the gate.

10 [0111]

(Supplementary Note 21)

The passage management system according to Supplementary Note
20, wherein
the housing and the gate are colored in a first color, and
15 the light-emitting member emits light in a second color different
from the first color.

[0112]

(Supplementary Note 22)

The passage management system according to Supplementary Note
20 20 or 21, wherein
a color of the door changes to a color in the same color family as a
color of the light-emitting member.

[0113]

(Supplementary Note 23)

25 The passage management system according to Supplementary Note
20, wherein
the gate includes a first guide member and a second guide member
as the guide member,

the first guide member includes the imaging unit as a first imaging

unit,

the second guide member includes the imaging unit as a second imaging unit, and

the light-emitting member of the second imaging unit is capable of
5 emitting light in conjunction with the light-emitting member of the first imaging unit in a case of failure of the authentication.

[0114]

(Supplementary Note 24)

An information processing method including:

10 causing, during waiting for authentication, a light-emitting member located at at least a part around a camera that captures a face image of an entering user and capable of emitting light according to a state of the authentication of the face image to emit light; and
performing the authentication based on the face image.

15 [0115]

(Supplementary Note 25)

A recording medium recording a program for causing a computer to function as:

lighting instruction means for causing, during waiting for
20 authentication, a light-emitting member located at at least a part around a camera that captures a face image of an entering user and capable of emitting light according to a state of the authentication of the face image to emit light; and

authentication means for performing the authentication based on
25 the face image.

Industrial Applicability

[0116]

According to one aspect described above, the user can easily grasp the camera position at the time of entering the gate.

Reference Signs List

[0117]

- 10 passage management system
- 1 gate
- 5 11 door
- 12 guide member
- 12L second guide member
- 12R first guide member
- 1RR gate
- 10 12RR third guide member
- 21ENTRR camera
- 2 imaging unit
- 21 camera
- 21ENDcamera
- 15 21ENT camera
- 22 housing
- 221 base portion
- 222 head portion
- 23 light-emitting member
- 20 24 cover
- 2ENT first imaging unit
- 2END second imaging unit
- 5 information processing device
- 51 lighting instruction means
- 25 52 authentication means
- 53 authentication data acquisition means
- 6 network
- 7 server
- 2m imaging unit

	21m	camera
	22m	housing
	23m	light-emitting member
	5m	information processing device
5	51m	lighting instruction means
	52m	authentication means
	A1	first region
	A2	second region
	A3	third region
10	A1INST	first region
	A2INST	second region
	CS	curved surface
	U	user
	X	certain user

CLAIMS

[Claim 1]

An imaging unit comprising:

- a camera provided in a gate having a door that opens and closes
- 5 based on a result of authentication of a face image of an entering user and
- a guide member provided with the door, the camera capturing the face
- image;
- a housing attached to the guide member and housing the camera;
- and
- 10 a light-emitting member located at at least a part around the
- camera and capable of emitting light according to a state of the
- authentication.

[Claim 2]

- The imaging unit according to claim 1,
- 15 wherein the light-emitting member is attached to the housing or is
- provided directly below the housing.

[Claim 3]

- The imaging unit according to claim 1 or 2, wherein
- the housing is attached to the guide member with a space, and
- 20 light emitted by the light-emitting member travels toward the user
- through the space.

[Claim 4]

- The imaging unit according to any one of claims 1 to 3, wherein
- the housing has, at at least a part around the camera, a first region
- 25 and a second region aligned with the first region in an extending direction
- of the gate,
- the first region is on a lens side of the camera relative to the
- second region, and
- the light-emitting member is capable of emitting light only in the

first region out of the first region and the second region during waiting for the authentication.

[Claim 5]

The imaging unit according to claim 4, wherein
5 a direction faced by the camera is inclined toward the user entering the gate relative to the extending direction of the gate,
the housing has, at at least a part around the camera, a third region aligned with the first region in a direction intersecting the extending direction of the gate,
10 the first region is on the user side relative to the third region, and
the light-emitting member is capable of emitting light only in the first region out of the first region and the third region.

[Claim 6]

The imaging unit according to claim 4,
15 wherein the light-emitting member is capable of emitting light in the first region and the second region in a case of failure of the authentication.

[Claim 7]

The imaging unit according to any one of claims 1 to 3,
20 wherein an optical axis of the light-emitting member is directed toward a center side of the housing.

[Claim 8]

The imaging unit according to claim 7, wherein
the housing has, at at least a part around the camera, a first region
25 and a second region aligned with the first region in an extending direction of the gate,
the first region is on a lens side of the camera relative to the second region, and
among an optical axis of the light-emitting member in the first

region and an optical axis of the light-emitting member in the second region, only the optical axis of the light-emitting member in the first region is directed toward the center side of the housing.

[Claim 9]

5 The imaging unit according to claim 3, wherein
 the housing or the gate has a reflecting surface that reflects light emitted by the light-emitting member, and
 a position of the reflecting surface overlaps the housing as viewed from an upper surface side of the housing.

10 [Claim 10]

 The imaging unit according to claim 9, wherein
 an optical axis of reflected light at the reflecting surface is directed toward a center side of the housing.

[Claim 11]

15 The imaging unit according to claim 9, wherein
 a position of the light-emitting member overlaps the housing as viewed from the upper surface side of the housing.

[Claim 12]

 The imaging unit according to claim 9, wherein
20 a position of the light-emitting member overlaps the housing or the gate as viewed from a side of the housing.

[Claim 13]

 An information processing device comprising:
 lighting instruction means for causing, according to a state of
25 authentication, a light-emitting member of an imaging unit to emit light,
 the imaging unit including
 a camera provided in a gate having a door that opens and closes based on a result of the authentication of a face image of an entering user and a guide member provided with the door, the camera

capturing the face image;

a housing attached to the guide member and housing the camera; and

the light-emitting member located at at least a part around
5 the camera; and

authentication means for performing the authentication.

[Claim 14]

The information processing device according to claim 13, wherein
the housing has, at at least a part around the camera, a first region
10 and a second region aligned with the first region in an extending direction
of the gate,

the first region is on a lens side of the camera relative to the
second region, and

the lighting instruction means causes the light-emitting member to
15 emit light only in the first region out of the first region and the second
region during waiting for the authentication.

[Claim 15]

The information processing device according to claim 14, wherein
the lighting instruction means causes the light-emitting member to
20 emit light in the first region and the second region in a case of failure of
the authentication.

[Claim 16]

A passage management system comprising:
the information processing device according to any one of claims
25 13 to 15;
the imaging unit; and
the gate.

[Claim 17]

The passage management system according to claim 16, wherein

the housing and the gate are colored in a first color, and
the light-emitting member emits light in a second color different
from the first color.

[Claim 18]

5 The passage management system according to claim 16, wherein
the gate includes a first guide member and a second guide member
as the guide member,

the first guide member includes the imaging unit as a first imaging
unit,

10 the second guide member includes the imaging unit as a second
imaging unit, and

the light-emitting member of the second imaging unit is capable of
emitting light in conjunction with the light-emitting member of the first
imaging unit in a case of failure of the authentication.

15 [Claim 19]

An information processing method comprising:

causing, during waiting for authentication, a light-emitting
member located at at least a part around a camera that captures a face
image of an entering user and capable of emitting light according to a
20 state of the authentication of the face image to emit light; and

performing the authentication based on the face image.

[Claim 20]

A recording medium recording a program for causing a computer to
function as:

25 lighting instruction means for causing, during waiting for
authentication, a light-emitting member located at at least a part around a
camera that captures a face image of an entering user and capable of
emitting light according to a state of the authentication of the face image
to emit light; and

authentication means for performing the authentication based on the face image.