

ELEVATOR SYSTEM

FIELD

Embodiments described herein relate generally to an elevator system.

5

BACKGROUND

In recent years, various techniques have been devised to prevent persons and objects from being caught in car doors of elevators. For example, the technique of capturing images of the vicinity of a car door by a camera and controlling the opening and closing of a door of an elevator based on whether or not a passenger exists in a detection area set in the vicinity of the car door has been devised.

10 In such a technique, a pattern (shape and size) of a detection area where a passenger is detectable is often fixed in advance for each building and common to all floors. However, in several buildings, the design of a hall varies from floor to floor, and a pattern of a detection area must be changed for each floor. In relation to this, there has been a method of defining in advance a detection area for each floor, and whenever an elevator stops at a floor, changing the detection area to a detection area corresponding to the floor at which the elevator is currently stopping.

15 However, the above method is disadvantageous in that when floor information indicating the floor at which the elevator is currently stopping cannot be obtained, it is impossible to change the detection area to a detection area corresponding to the floor at which the elevator is stopping, that is, to set a detection area suitable to the floor at which the elevator is stopping.

SUMMARY

20 In general, according to one embodiment, an elevator system includes an image capture module, a

storage, a setting module, a detector and a controller.
The image capture module is installed in a car, and is
allowed to capture an image in a predetermined range
extending from a vicinity of a door in the car toward a
5 hall. The storage stores pattern information items of
a passenger-detection area varying according to a shape
of each hall. The setting module compares the image
captured by the image capture module with each of the
stored pattern information items, selects a pattern
10 information item corresponding to a shape of a hall
shown in the captured image, and sets a passenger-
detection area indicated by the pattern information
item. The detector detects a passenger in the
passenger-detection area set by the setting module.
15 The controller controls opening and closing of the
door, based on a result of detection by the detector.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 shows a schematic structure example of an
elevator system according to an embodiment.

20 FIG. 2 shows an example of an area-setting
information item according to the embodiment.

FIG. 3 shows an example of the area-setting
information item according to the embodiment.

25 FIG. 4 is a diagram for explaining a three-sided
frame.

FIG. 5 is a flowchart showing an example of
operations of an image processor according to the
embodiment.

30 FIG. 6 shows an example of a result of extraction
by an edge-and-corner extraction module according to
the embodiment.

FIG. 7 shows an example of a result of matching by
an edge-and-corner matching module according to the
embodiment.

35 FIG. 8 shows an example of the result of matching

by the edge-and-corner matching module according to the embodiment.

FIG. 9 shows an example of the area-setting information item according to the embodiment.

5 FIG. 10 shows an example of the result of extraction by the edge-and-corner extraction module according to the embodiment.

DETAILED DESCRIPTION

10 Embodiments will be described hereinafter with reference to the drawings.

FIG. 1 shows a schematic structure example of an elevator system according to an embodiment. Although one car will be herein described as an example, the structure is the same with a plurality of cars.

15 A camera 12 (which may be referred to as an image capture module) is installed at an upper part of a doorway of a car 11. To be specific, the camera 12 is installed in a modesty panel 11a which covers the upper part of the doorway of the car 11 such that a lens
20 portion of the camera 12 faces a hall 15. The camera 12 is a small monitoring camera, for example, a vehicle-mounted camera. The camera 12 includes a wide-angle lens, and is capable of successively capturing images of several frames per second (for example,
25 30 frames/sec).

 The camera 12 may be powered on at all times to capture images at all times, or may be powered on (activated) with a predetermined timing to start capturing images and powered off with a predetermined
30 timing to finish capturing images.

 To be specific, the camera 12 may be powered on when the travel speed of the car 11 is less than a predetermined value, and powered off when the travel speed of the car 11 is greater than or equal to the
35 predetermined value. In this case, the camera 12 is

powered on and starts capturing images, when the car 11 starts decelerating to stop at a predetermined floor and the travel speed becomes less than the predetermined value. On the other hand, the camera 12 is powered off and finishes capturing images, when the car 11 starts accelerating to travel toward a predetermined floor and the travel speed becomes greater than or equal to the predetermined value.

That is, the camera 12 continues capturing images from when the car 11 starts decelerating to stop at a predetermined floor and the travel speed becomes less than the predetermined value, while the car 11 is stopping at the predetermined floor, and until the car 11 starts accelerating to travel from the predetermined floor toward another floor and the speed of travel becomes greater than or equal to the predetermined value.

By powering the camera 12 on or off in this manner, a power saving effect can be obtained as compared to that in the case where the camera 12 is powered on at all times.

An image capture range of the camera 12 is set to $L1 + L2$ ($L1 > L2$). $L1$ is an image capture range on the hall 15 side, and is, for example, 3 m from a car door 13 toward the hall 15. $L2$ is an image capture range on the car 11 side, and is, for example, 50 cm from the car door 13 toward the back of the car. $L2$ and $L1$ are ranges in the depth direction, and ranges in the width direction (orthogonal to the depth direction) are greater than at least the width of the car 11.

In the hall 15 on each floor, a hall door 14 is installed to be openable and closable at a place where the car 11 arrives. The hall door 14 engages with the car door 13 to be opened and closed when the car 11 arrives. A power source (door motor) is provided on

the car 11 side, and the hall door 14 is opened and closed only in accordance with the car door 13. In the following description, it is assumed that when the car door 13 is opened, the hall door 14 is also opened, and
5 when the car door 13 is closed, the hall door 14 is also closed.

Each of images (video) successively captured by the camera 12 is subjected to analytical processing by the image processor 20 in real time. To be specific,
10 the image processor 20 detects (a movement of) a passenger who is the closest to the car door 13 based on a change in a brightness value in the images, and determines whether or not the detected passenger intends to get into the car 11, whether or not the hand
15 or arm of the detected passenger may be drawn into a door pocket, etc. A result of the analytical processing executed by the image processor 20 is reflected as necessary in the control processing (mainly, door-opening-and-closing control processing)
20 executed by an elevator controller 30.

The elevator controller 30 controls the opening and closing of the car door 13 when the car 11 arrives at the hall 15. To be specific, the elevator controller 30 opens the car door 13 when the car 11
25 arrives at the hall 15, and closes the car door 13 after a predetermined period of time elapses.

Further, if the image processor 20 detects a passenger who intends to get into the car 11, the elevator controller 30 prohibits the car door 13 from
30 being closed and keeps the car door 13 opened (in other words, prolongs a period of time for which the car door 13 is opened). In addition, if the image processor 20 detects a passenger whose hand or arm may be drawn into the door pocket, the elevator controller 30 prohibits
35 the car door 13 from being opened, reduces the speed at

which the car door 13 is opened, or warns the passenger to stay away from the car door 13.

FIG. 1 shows the image processor 20 being outside the car 11 for the sake of convenience. However, in reality, the image processor 20 is housed in the
5 modesty panel 11a with the camera 12.

The image processor 20 includes a storage 21, a passenger detector 22, an area-setting-information storage 23, an area-setting selector 24, etc. The
10 storage 21 stores images captured by the camera 12 (captured images) sequentially. The storage 21 includes a buffer area for temporarily holding data necessary for the processing executed by the passenger detector 22.

15 The passenger detector 22 detects (a movement of) a passenger who is the closest to the car door 13 in a passenger-detection area based on a change in a brightness value in the captured images, and determines whether or not the detected passenger intends to get
20 into the car 11, whether or not the hand or arm of the detected passenger may be drawn into the door pocket, etc. Results of these determinations by the passenger detector 22 are reflected as necessary in the door-opening-and-closing control of the car door 13 executed
25 by the elevator controller 30.

In the area-setting-information storage 23, area-setting information items (also referred to as pattern information items) indicating passenger-detection areas set (calibrated) on site as initial settings are stored
30 in advance. The same number of area-setting information items as the number of kinds of pattern (shape and size) of passenger-detection areas are stored in the area-setting-information storage 23. For example, if the pattern of a passenger-detection area
35 varies from floor to floor in a five-storied building,

five area-setting information items are stored in the area-setting-information storage 23.

5 An area-setting information item is data with which area information and edge-and-corner information are associated. The area information indicates a passenger-detection area set for a predetermined floor. The edge-and-corner information includes edge information and corner information. The edge information indicates the outline of a passenger-
10 detection area (in other words, a borderline between the passenger-detection area and an area [object] except the passenger-detection area) indicated by the associated area information. The corner information indicates a feature point of the passenger-detection
15 area indicated by the associated area information.

For example, regarding a passenger-detection area set as an initial setting for a first floor of a predetermined building, an area-setting information item with which area information shown in FIG. 2 (a) and edge-and-corner information shown in FIG. 2 (b) are
20 associated indicates that a passenger-detection area E1 shown in FIG. 2 (a) includes edges e_{A1} to e_{A7} shown in FIG. 2 (b) and corners c_{A1} and c_{A2} shown in FIG. 2 (b).

Similarly, regarding a passenger-detection area set as an initial setting for a second floor of the
25 predetermined building, an area-setting information with which area information shown in FIG. 3 (a) and edge-and-corner information shown in FIG. 3 (b) are associated indicates that a passenger-detection area E2 shown in FIG. 3 (a) includes edges e_{B1} to e_{B7} shown in
30 FIG. 3 (b) and corners c_{B1} and c_{B2} shown in FIG. 3 (b).

As shown in FIG. 2 and FIG. 3, the shape of a passenger-detection area is determined on the basis of the design (shape) of a hall on each floor, more

specifically, the shape of a three-sided frame on each floor.

The three-sided frame will be herein explained with reference to FIG. 4.

5 The three-sided frame is a frame installed on the periphery of the hall door 14, and includes three frames of a left frame 16A located on the left from the perspective of the car 11 side (on the right from the perspective of the hall 15 side), an upper frame 16B
10 located in the upper part of the hall 15, and a right frame 16C located on the right from the perspective of the car 11 side (on the left from the perspective of the hall 15 side). The left frame 16A and the right frame 16C are in contact with a wall W of a building.

15 A corner on the wall W side of the left frame 16A which is in contact with the ground will be referred to as a left corner Cl, and a corner on the wall W side of the right frame 16C which is in contact with the ground will be referred to as a right corner Cr.

20 In addition, of sides constituting an inner surface of the left frame 16A, a side on the hall 15 side which extends vertically from a floor of the hall 15 will be referred to as a left side Hl_A. Of the sides constituting the inner surface of the left frame
25 16A, a side which is in contact with the floor of the hall 15 will be referred to as a left side Hl_B.

 Moreover, of sides constituting an inner surface of the right frame 16C, a side on the hall 15 side which vertically extends from the floor of the hall 15
30 will be referred to as a right side Hr_A. Of the sides constituting the inner surface of the right frame 16C, a side which is in contact with the floor of the hall 15 will be referred to a right side Hr_B.

 That is, the edge e_{A2} shown in FIG. 2 is an edge

corresponding to the left side Hl_A of the three-sided frame shown in FIG. 4. Similarly, the edge e_{A3} is an edge corresponding to the left side Hl_B of the three-sided frame, the edge e_{A5} is an edge corresponding to the right side Hr_B of the three-sided frame, and the edge e_{A6} is an edge corresponding to the right side Hr_A of the three-sided frame. Further, the corner c_{A1} is a corner corresponding to the left corner Cl , and the corner c_{A2} is a corner corresponding to the right corner Cr .

The edges e_{A1} and e_{A7} are segments for defining a passenger-detection area, and do not exist in the hall 15 in reality. Moreover, the edge e_{A4} is an edge corresponding to a side on the hall 15 side which extends parallel to directions in which the hall door 14 (the car door 13) is opened and closed of sides constituting a sill on the hall 15 side.

The correspondence between FIG. 3 and FIG. 4 is the same as the above-explained correspondence between FIG. 2 and FIG. 4, and thus its detailed description is omitted herein.

FIG. 1 is now referred to again. The area-setting selector 24 sets a passenger-detection area suitable for a floor at which the car 11 is currently stopping. The area-setting selector 24 further includes an edge-and-corner extraction module 24a, an edge-and-corner matching module 24b, etc.

The edge-and-corner extraction module 24a extracts edges and corners from an image which is captured for a first time after the car 11 arrives at a predetermined floor and the car door 13 is fully opened (hereinafter, referred to as an initial image in a fully opened state). More specifically, the edge-and-corner

extraction module 24a extracts edges and corners from the initial image in the fully opened state by performing well-known image processing, such as Sobel edge detection and SIFT corner feature point detection, for the initial image in the fully opened state. A result of extraction indicating the extracted edges and corners is transmitted to the edge-and-corner matching module 24b.

The edge-and-corner matching module 24b performs matching by comparing the edges and corners extracted from the initial image in the fully opened state indicated by the result of extraction with edges and corners indicated by edge-and-corner information included in an area-setting information item stored in the area-setting-information storage 23. The edge-and-corner matching module 24b calculates the rate of coincidence (rate of matching) between the edges and corners extracted from the initial image in the fully opened state and the edges and corners indicated by the edge-and-corner information as a result of the above matching.

The above processing by the edge-and-corner matching module 24b is repeated to be sequentially executed for all the area-setting information items stored in the area-setting-information storage 23.

The edge-and-corner matching module 24b selects an area-setting information item corresponding to the greatest rate of coincidence of the calculated rates of coincidence, and sets a passenger-detection area indicated by area information included in the selected area-setting information item as a passenger-detection area for a floor at which the car 11 is currently stopping.

An example of operations performed to set a passenger-detection area by the image processor having

the above-described structure will be next described with reference to the flowchart of FIG. 5. It is herein assumed that the area-setting information items shown in FIG. 2 and FIG. 3 are stored in advance in the
5 area-setting-information storage 23 of the image processor 20.

First, the area-setting selector 24 of the image processor 20 receives, from the elevator controller 30, state information indicating that the car 11 arrives at
10 a predetermined floor and the car door 13 is fully opened (step S1). Upon receipt of the state information, the area-setting selector 24 acquires, from the camera 12, an initial image in a fully opened state which is captured for a first time after the car
15 door 13 is fully opened (step S2).

Then, the edge-and-corner extraction module 24a of the area-setting selector 24 extracts edges and corners from the initial image in the fully opened state (step S3). It is herein assumed that edges and corners shown
20 in FIG. 6 are extracted from the initial image in the fully opened state.

When the edges and corners are extracted from the initial image in the fully opened state, the edge-and-corner matching module 24b of the area-setting selector
25 24 performs matching between the extracted edges and corners and edges and corners indicated by edge-and-corner information included in an area-setting information item stored in the area-setting-information storage 23 (step S4). Then, the edge-and-corner
30 matching module 24b calculates the rate of coincidence between the edges and corners extracted from the initial image in the fully opened state and the edges and corners indicated by the edge-and-corner information (step S5).

35 The edge-and-corner matching module 24b determines

whether or not the rates of coincidence of all the area-setting information items stored in the area-setting-information storage 23 are calculated. That is, the edge-and-corner matching module 24b determines
5 whether or not the above processes in steps S4 and S5 are executed for all the area-setting information items stored in the area-setting-information storage 23 (step S6).

If it is determined that the rates of coincidence
10 of all the area-setting information items are not calculated as a result of the above process in step S6 (NO in step S6), the edge-and-corner matching module 24b executes the above processes in steps S4 and S5 for an area-setting information, the rate of coincidence of
15 which has not been calculated yet. In contrast, if it is determined that the rates of coincidence of all the area-setting information items are calculated as a result of the above process in step S6 (YES in step S6), the flow proceeds to the process in step S7, which
20 will be described later.

The above processes in steps S4 and S5 are herein specifically described.

As stated above, it is herein assumed that the area-setting information items shown in FIG. 2 and
25 FIG. 3 are stored in advance in the area-setting-information storage 23. Thus, the matching between the edges and corners shown in FIG. 6 and the edges and corners shown in FIG. 2 (b) is performed first. In this case, as indicated by solid lines in FIG. 7, the
30 edges e_{A2} to e_{A6} and the corners c_{A1} and c_{A2} shown in FIG. 2 (b) coincide with (match) the edges and corners shown in FIG. 6.

That is, the five edges e_{A2} to e_{A6} and the two corners c_{A1} and c_{A2} of the seven edges e_{A1} to e_{A7} and

the two corners c_{A1} and c_{A2} indicated by the edge-and-corner information shown in FIG. 2 (b) coincide with the edges and corners shown in FIG. 6. Accordingly, the rate of coincidence is calculated at 7/9 (= approximately 78%).

Similarly, the matching between the edges and corners shown in FIG. 6 and the edges and corners shown in FIG. 3 (b) is performed. In this case, as indicated by a solid line in FIG. 8, the edge e_{B4} shown in FIG. 3 (b) coincides with (matches) the edges and corners shown in FIG. 6.

That is, the only one edge e_{B4} of the seven edges e_{B1} to e_{B7} and the corners c_{B1} and c_{B2} indicated by the edge-and-corner information shown in FIG. 3 (b) coincides with the edges and corners shown in FIG. 6. Accordingly, the rate of coincidence is calculated at 1/9 (= approximately 11%).

FIG. 5 is now referred to again. When the rates of coincidence of all the area-setting information items are calculated, the edge-and-corner matching module 24b selects an area-setting information item corresponding to the greatest rate of coincidence of the calculated rates of coincidence (step S7). Here, as stated above, the rate of coincidence corresponding to the area-setting information item shown in FIG. 2 is approximately 78%, and the rate of coincidence corresponding to the area-setting information item shown in FIG. 3 is approximately 11%. Thus, the area-setting information item shown in FIG. 2 is selected.

Then, the area-setting selector 24 sets a passenger-detection area indicated by area information included in the selected area-setting information item as a passenger-detection area for a floor at which the car 11 is currently stopping (step S8), and ends the

processes herein.

That is, the area-setting information item shown in FIG. 2 is herein selected, and thus, the passenger-detection area E1 is set as a suitable passenger-detection area.

When the passenger-detection area for detecting a passenger is normally set in the above-described manner, the passenger detector 22 of the image processor 20 starts a process for detecting a passenger.

In the present embodiment, the edge-and-corner matching module 24b calculates the rates of coincidence of edges and corners, but the calculation is not limited to this. The edge-and-corner matching module 24b may calculate the rates of coincidence of edges only or the rates of coincidence of corners only.

In addition, in the present embodiment, edge-and-corner information included in an area-setting information item is stored in the area-setting-information storage 23 in the forms shown in FIG. 2 (b) and FIG. 3 (b), but the forms are not limited to these. The edge-and-corner information may be stored in the form shown in FIG. 9. That is, as shown in FIG. 9, the edge-and-corner information is a segment for defining a passenger-detection area, and may be stored in the form in which segments that do not exist in the hall 15 in reality are excluded.

This can reduce the possibility that the segments that do not exist in the hall 15 in reality indicated by the edge-and-corner information erroneously coincide with unnecessary edges extracted by the edge-and-corner extraction module 24a and an unsuitable passenger-detection area is set.

Moreover, the present embodiment has been described on the assumption that no person is shown in

the initial image in the fully opened state as shown in
FIG. 6. However, in reality, there is a possibility
that a person is shown in the initial image in the
fully opened state as shown in FIG. 10 (a), and
5 unnecessary edges corresponding to the person are
extracted by the edge-and-corner extraction module 24a
as shown in FIG. 10 (b).

However, even in such a case, basically, edges and
corners that do not coincide with edges and corners
10 indicated by edge-and-corner information will merely
increase. Thus, the accuracy in setting a passenger-
detection area does not greatly deteriorate.
Nevertheless, it is also possible to prevent the edges
corresponding to a person who is moving shown in
15 FIG. 10 (b) (unnecessary edges) from being extracted by
limiting edges and corners to be extracted from the
initial image in the fully opened state to motionless
edges and corners only.

Further, in the present embodiment, it is assumed
20 that area-setting information items corresponding to
the designs of halls of a building where it is
installed are stored in the area-setting-information
storage 23. However, regardless of the designs of the
halls of the building where it is installed, an area-
25 setting information item corresponding to the design of
a standard hall (which may be referred to as a standard
pattern information item) may be further stored in the
area-setting-information storage 23.

This enables the area-setting selector 24 to set a
30 passenger-detection area indicated by the area-setting
information item corresponding to the design of the
standard hall, for example, even if edges and corners
are not extracted by the edge-and-corner extraction
module 24a (that is, even if an area-setting
35 information item is not selected by the edge-and-corner

matching module 24b) because of surroundings in which
the initial image in the fully opened state is captured
(for example, too dark surroundings). Thus, the
situation where a passenger-detection area is not set
5 can be prevented.

Furthermore, when the area-setting information
item corresponding to the design of the standard hall
is not further stored, an area-setting information item
corresponding to a design similar to that of the
10 standard hall of the area-setting information items
corresponding to the designs of the halls of the
building where it is installed may be used instead of
the area-setting information item corresponding to the
design of the standard hall. Alternatively, an area-
15 setting information item indicating the smallest
passenger-detection area of the area-setting
information items corresponding to the designs of the
halls of the building where it is installed may be used
instead of the area-setting information item
20 corresponding to the design of the standard hall.

According to the above-described one embodiment,
the elevator system includes the image processor 20
including the area-setting-information storage 23 and
the area-setting selector 24. The area-setting-
25 information storage 23 stores area-setting information
items of a passenger-detection area varying according
to the design (shape) of each hall when initial
settings are determined. The area-setting selector 24
extracts edges and corners from the initial image in
30 the fully opening state, selects an area-setting
information item corresponding to the extracted edges
and corners, and sets a passenger-detection area.

Accordingly, it is possible to provide an elevator
system capable of setting a detection area suitable for
35 a floor at which an elevator is currently stopping even

when floor information of the elevator cannot be
obtained in a building where the design of a hall
varies from floor to floor. In addition, it is
possible to prevent a failure to detect a passenger and
5 excess detection of a passenger caused when an
unsuitable detection-area is set.

Moreover, as described above, a suitable detection
area can be set for a floor at which an elevator is
currently stopping, even when floor information of the
10 elevator cannot be obtained in a building where the
design of a hall varies from floor to floor. This is
also advantageous in that it is unnecessary to build
more wiring for transferring floor information between
the image processor 20 and the elevator controller 30,
15 etc.

While certain embodiments have been described,
these embodiments have been presented by way of example
only, and are not intended to limit the scope of the
inventions. Indeed, the novel embodiments described
20 herein may be embodied in a variety of other forms;
furthermore, various omissions, substitutions and
changes in the form of the embodiments described herein
may be made without departing from the spirit of the
inventions. The accompanying claims and their
25 equivalents are intended to cover such forms or
modifications as would fall within the scope and spirit
of the inventions.

WHAT IS CLAIMED IS:

1. An elevator system comprising:

an image capture module installed in a car, and
allowed to capture an image in a predetermined range
5 extending from a vicinity of a door in the car toward a
hall;

a storage which stores pattern information items
of a passenger-detection area varying according to a
shape of each hall;

10 a setting module which compares the image captured
by the image capture module with each of the stored
pattern information items, which selects a pattern
information item corresponding to a shape of a hall
shown in the captured image, and which sets a
15 passenger-detection area indicated by the pattern
information item;

a detector which detects a passenger in the
passenger-detection area set by the setting module; and

a controller which controls opening and closing of
20 the door, based on a result of detection by the
detector.

2. The elevator system of Claim 1, wherein the
setting module compares an image captured for a first
time after the door is fully opened with each of the
25 stored pattern information items.

3. The elevator system of Claim 1, wherein the
storage stores pattern information items of a
passenger-detection area varying according to a shape
of a three-sided frame installed in the hall.

30 4. The elevator system of Claim 3, wherein the
storage stores a first edge, a second edge, and a third
edge as the pattern information items, the first edge
corresponding to a side on the hall side extending
vertically with respect to a floor of the hall of sides
35 constituting each of right and left frames of three

frames constituting the three-sided frame, the second edge corresponding to a side which is in contact with the floor of the hall of the sides constituting each of the right and left frames, the third edge corresponding to a side on the hall side extending parallel to directions in which the door is opened and closed of sides constituting a sill on the hall side.

5 5. The elevator system of Claim 4, wherein the setting module
10 extracts edges from the captured image,
 performs matching between the extracted edges and the first to third edges indicated by the pattern information items, and calculates a rate of coincidence between the extracted edges and the first to third
15 edges for each of the pattern information items, and
 selects a pattern information item corresponding to a greatest rate of coincidence of the calculated rates of coincidence, and sets the passenger-detection area.

20 6. The elevator system of Claim 3, wherein the storage stores corners on a building-wall side which are in contact with a floor of the hall of right and left frames of three frames constituting the three-sided frame as the pattern information items.

25 7. The elevator system of Claim 6, wherein the setting module
 extracts corners from the captured image,
 performs matching between the extracted corners and corners indicated by the pattern information items,
30 and calculates a rate of coincidence between the extracted corners and the corners indicated by the pattern information items for each of the pattern information items, and
 selects a pattern information item corresponding
35 to a greatest rate of coincidence of the calculated

rates of coincidence, and sets the passenger-detection area.

5 8. The elevator system of Claim 1, wherein the storage further stores a standard pattern information item of a passenger-detection area corresponding to a shape of a standard hall in addition to the pattern information items stored according to the shape of each hall, and

10 the setting module selects the stored standard pattern information item and sets a passenger-detection area indicated by the standard pattern information item, when a pattern information item corresponding to the shape of the hall shown in the captured image is not obtained as a result of the comparison.