(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 3 587 215 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
01.01.2020 Bulletin 2020/01

(21) Application number: **18756716.9**

(22) Date of filing: **19.01.2018**

(51) Int Cl.:
B61L 25/02 *(2006.01)* ***B61D 37/00*** *(2006.01)*

(86) International application number:
PCT/JP2018/001691

(87) International publication number:
WO 2018/155031 (30.08.2018 Gazette 2018/35)

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA MD TN

(30) Priority: **24.02.2017 JP 2017034146**

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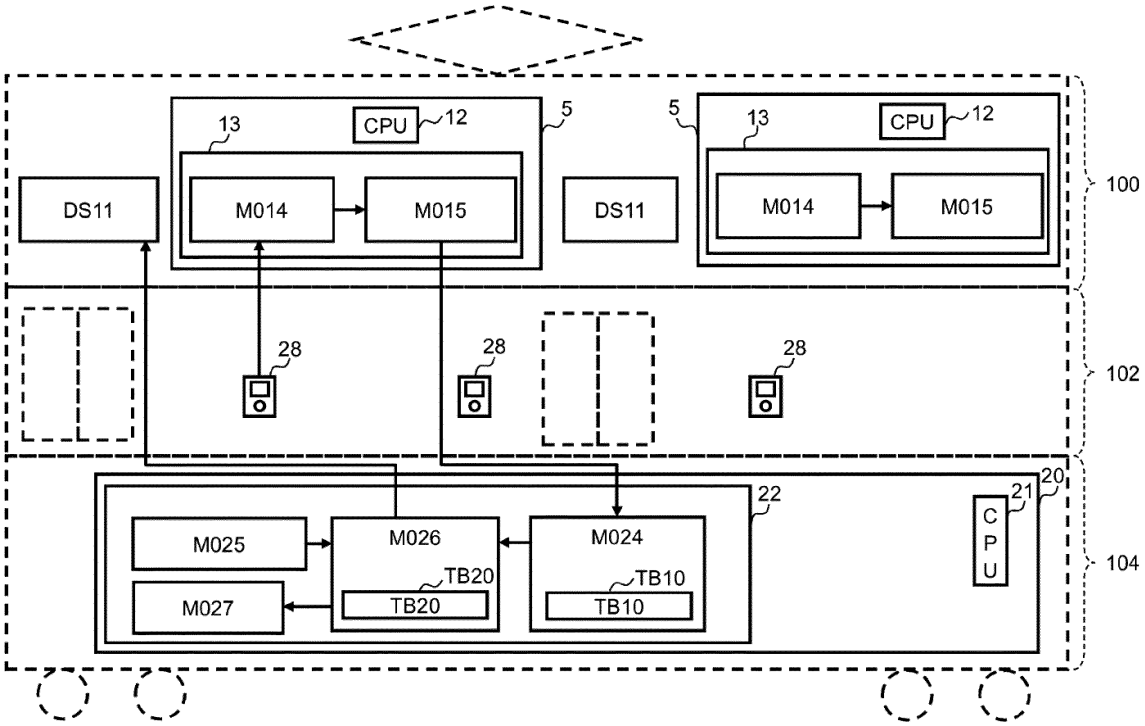
(54) MANAGEMENT SYSTEM, MANAGEMENT DEVICE AND MANAGEMENT METHOD

(57) According to a timing at which a plurality of people exit from each of the predetermined areas in the predetermined area where the plurality of people can enter and exit through a plurality of gates, a gate to be used when the plurality of people exit from each of the predetermined areas is determined among the plurality of gates based upon a positional relationship between respective positions of the plurality of people and the plurality of gates, information on a person exiting from the predetermined area is generated for each of the plurality of gates, and the generated information is notified.

[FIG. 2]



EP 3 587 215 A1

Description

Technical Field

[0001] The present invention relates to a system that manages the exit of a person from the inside of a predetermined space to the outside of a predetermined space and the entry of a person from the outside of the predetermined space to the inside of the predetermined space and, for example, to a system that manages getting on and off of a passenger in a passenger compartment of a train.

Background Art

[0002] As this type of system, there exists a getting on and off assistance system allowing a passenger to smoothly get on and off by sharing getting-off information on a getting-off place where a passenger other than himself or herself gets off among a plurality of passengers getting on a transportation system such as a bus, a train, and the like (PTL 1).

[0003] In PTL 2, for a smooth flow of people in one direction or both directions at a narrow entrance, disclosed is a system that rings a mobile terminal to inform presence of a person passing through the entrance to surrounding people or to know arriving at a destination, and for example, when getting on a train, bus, and the like, causes the mobile terminal to inform the destination to a vehicle for the informed vehicle to transmit information to the mobile terminal and ring the mobile terminal when arriving at the destination, or causes a display device to display that a person to get off is present for surrounding people to consider the person to get off and a person to get on from now waits for the person to get off and then gets on, thereby making smooth performance of getting on and off.

Citation List

Patent Literature

[0004]

PTL 1: JP-A-2008-65759
PTL 1: JP-A-2005-81993

Summary of Invention

Technical Problem

[0005] For example, in the case of a metropolitan area, on a route where a large number of work commuters and school commuters is concentrated on a train in a short period of time and frequently gets on and off the train repeatedly, as in a system of the related art, it is not sufficient enough for a passenger to smoothly get on and off only by informing the passenger who tries to get on or off and the passenger therearound about the timing of getting on and off.

[0006] Therefore, an object of the present invention is to allow a passenger to smoothly get on and off even when a large number of passengers is concentrated in a short period of time and frequently gets on and off repeatedly.

Solution to Problem

[0007] In order to solve the above-described problem, in the present invention, according to a timing at which a plurality of people exit from each of the predetermined areas in the predetermined area where the plurality of people can enter and exit through a plurality of gates, a gate to be used when the plurality of people exit from each of the predetermined areas is determined among the plurality of gates based on a positional relationship between respective positions of the plurality of people and the plurality of gates, information on a person exiting from the predetermined area is generated for each of the plurality of gates, and the generated information is notified.

Advantageous Effects of Invention

[0008] According to the present invention, it is possible to provide a management system, and the like that can be appropriately applied for allowing a passenger to smoothly get on and off even when a large number of passengers is concentrated and frequently gets on and off repeatedly.

Brief Description of Drawings

[0009]

[Fig. 1] Fig. 1 is a block diagram illustrating a configuration of an on-vehicle mounting device according to an embodiment.
[Fig. 2] Fig. 2 is a block diagram illustrating a configuration of an on-vehicle mounting device according to an embodiment.
[Fig. 3] Fig. 3 is a conceptual diagram for providing the description of a boarding position estimating function according to an embodiment.
[Fig. 4] Fig. 4 is a block diagram illustrating a configuration of an on-vehicle mounting device according to an embodiment.
[Fig. 5] Fig. 5 is conceptual diagram illustrating a configuration of a passenger information table.
[Fig. 6] Fig. 6 is a conceptual diagram illustrating a configuration of a congestion status table.
[Fig. 7] Fig. 7 is a schematic diagram illustrating a screen configuration example of an in-vehicle guidance display screen according to an embodiment.
[Fig. 8] Fig. 8 is a flowchart illustrating a processing procedure of vehicle processing according to an em-

bodiment.

[Fig. 9] Fig. 9 is a flowchart illustrating a processing procedure of vehicle processing according to a second embodiment.

Description of Embodiments

[0010] Hereinafter, an embodiment of the present invention will be described with reference to the accompanying drawings.

(1) Configuration of Congestion Mitigation System according to the embodiment.

[0011] In Fig. 1, a reference sign 1 generally indicates a congestion mitigation system according to the embodiment. The congestion mitigation system 1 includes: a plurality of communication devices 5 as receivers installed in vehicles (predetermined areas) of respective vehicles of a railway vehicle (TR); a control device 20 respectively installed for each formation of the railway vehicle; a plurality of terminal devices (hereinafter referred to as a portable terminal 28); and a premises guidance device 30 installed in the premises of each station (ST).

[0012] As illustrated in Fig. 2, the communication device 5 and the control device 20 are respectively installed on a ceiling 100 of the railway vehicle and an underfloor 104 thereof, and are connected to each other by wire or wireless, thereby exchanging information. A reference sign 102 indicates the inside of the vehicle. The communication device 5 is configured with, for example, a router, and the like, and includes a central processing unit (CPU) 12, a memory 13, and a wireless communication device (not illustrated). The respective communication devices 5 are associated with a plurality of gates (hereinafter referred to as an opening and closing door or a door) installed in the respective vehicles of the railway vehicle on a one-to-one basis.

[0013] The CPU 12 is a processor that performs the operation control of the whole communication device 5. The memory 13 is configured with, for example, a volatile semiconductor memory, and is used as a work memory of the CPU 12. A getting-off station information receiving module (MO14) and a getting-off door position estimating module (MO15), which will be described later, are also stored and held in the memory 13.

[0014] The wireless communication device is, for example, a device transmitting and receiving a wireless LAN, and receives, for example, an identification number of the portable terminal 28 such as a MAC address, and the like and getting-off station information which is information on a station at which a passenger is expected to get off from the respective portable terminals 28. The wireless communication device measures the radio wave intensity of each portable terminal 28 as illustrated in Fig. 3.

[0015] In each wireless communication device, there exists each data receivable range 29 in which each wireless communication device can receive data. The portable terminal 28 determines a door which is associated with the wireless communication device in the data receivable range 29 having the highest radio wave intensity among the respective data receivable ranges 29 as a getting-off-expected door. Then, the portable terminal 28 transmits the identification number and the getting-off station information to the communication device 5 having the highest radio wave intensity. Here, the portable terminal 28 determines that the door corresponding to the communication device 5 having the highest radio wave intensity is closest, and then transmits the determination result to the control device 20.

[0016] The control device 20 is a server device which respectively transmits a congestion status of the railway vehicle on which the control device 20 is mounted to an in-vehicle guidance display device (DS11) and the premises guidance device 30 of a stop station after the latest stop station. The control device 20 includes a CPU 21, a memory 22, and a communication device (not illustrated).

[0017] The in-vehicle guidance display device (DS11) is associated with the door on a one-to-one basis, and displays in-vehicle guidance such as the next stop station and whether a door associated with the in-vehicle guidance display device (DS11) is a door that opens at the next stop station.

[0018] The control device 20 calculates the number of people (referred to as a user or a passenger) who get off from the respective doors based on pieces of vehicle information including positional information, information on the next station, information on the door to be opened at the next station, and a boarding rate acquired from a vehicle information control device which is not illustrated. It goes without saying that the vehicle information is based upon the operation of the railway vehicle.

[0019] The vehicle information control device is a device that holds information on the railway vehicle such as positional information indicating that the railway vehicle is currently located at which station or between stations, information on train types such as a train stopping at each station and an express train, information on the boarding rate of the railway vehicle, and the like. The positional information is measured by using a speed generator, and the boarding rate is measured by using a load compensating device.

[0020] The CPU 21 is a processor that performs the operation control of the whole control device 20. The memory 22 is configured with, for example, a volatile semiconductor memory and is used as a work memory of the CPU 21.

[0021] A passenger information accumulation module (MO24), a vehicle information acquisition module (MO25), a vehicle processing module (MO26), and a getting-off notification information transmission module (MO27), which will be described later, are also stored and held in the memory 22. The passenger information

accumulation module (MO24) holds a passenger information table (TB10) which will be described later, and the vehicle processing module (MO26) holds a congestion status TB20.

[0022] The portable terminal 28 holds the identification number and the getting-off station information. It is assumed that the getting-off station information is inputted by a user from the portable terminal 28.

[0023] As illustrated in Fig. 4, the premises guidance device 30 and a plurality of premises guidance display devices 35 are installed in the premises of each station. The premises guidance device 30 transmits information based upon the congestion status information received from the railway vehicle to each of the premises guidance display devices 35 in the premises of the station. The premises guidance device 30 includes a CPU 31 and a memory 32.

[0024] The CPU 31 is a processor that performs the operation control of the whole premises guidance device 30. The memory 32 is configured with, for example, a volatile semiconductor memory, and is used as a work memory of the CPU 31. A getting-off notification information receiving module (MO33) and a getting-off notification information processing module (MO34), which will be described later, are also stored and held in the memory 32.

[0025] The premises guidance display devices (DS35) are respectively installed at positions in the station premises corresponding to the respective doors plurally installed in the respective vehicles of the railway vehicle. For example, a home door is installed at this position, and the premises guidance display device (DS35) is installed as a set with the home door.

(2) Congestion Mitigation Function

[0026] Next, a congestion mitigation function mounted on the control device 20 will be described. In the control device 20, a function of determining the number of people getting off from the respective doors of the railway vehicle thereof based upon the information of the user acquired by the communication device 5 and the information of the railway vehicle acquired by a vehicle control device, and of reducing the congestion in the vehicle by informing users around the doors about the determined the number of people getting off therefrom is mounted.

[0027] The getting-off station information receiving module (MO14) is a program that receives the identification number and the getting-off station information from the portable terminal 28. The getting-off door position estimating module (MO15) is a program that determines a door for each user to get off based upon the identification number and the getting-off station information received by the getting-off station information receiving module (MO14).

[0028] The getting-off door position estimating module (MO15) transmits passenger information illustrated in Fig. 5 to the passenger information accumulation module (MO24). The passenger information includes getting-on vehicle information which is the number of the vehicle which the user is getting on and getting-off expected door information which is the number of the door used by the user in addition to the identification number and the getting-off station information.

[0029] Since the communication device 5 and the door correspond to each other, the getting-off door position estimating module (MO15) can acquire the getting-on vehicle information and the getting-off expected door information. The passenger information accumulation module (MO24) is a program that stores the passenger information in the passenger information table (TB10).

[0030] The passenger information table (TB10) is a table used for managing the passenger information and has a configuration illustrated in Fig. 5. In the passenger information table (TB10), one record (a row) 500 corresponds to data of a passenger who is one user.

[0031] In the passenger information table (TB10), each record is respectively divided into a passenger name column TB11, an identification number column TB12, a getting-off expected station column TB13, a getting-on vehicle column TB14, and a getting-off expected door column TB15.

[0032] The name (NAME) of the user holding the portable terminal 28 is stored in the passenger name column TB11; an identification number (ID) of the portable terminal 28 is stored in the identification number column TB 12; and the name of the getting-off expected station (ST) which is a station where the user is expected to get off is stored in the getting-off expected station column TB13. The number (NU) of the vehicle on which the user gets is stored in the getting-on vehicle column TB14; and the number of the door (DO) to be used by the user is stored in the getting-off expected door column TB15. Since the passenger name column TB11 and the identification number column TB12 are similar information, at least one of the passenger name column TB11 and the identification number column TB12 may be required.

[0033] The vehicle information acquisition module (MO25) is a program that acquires positional information of a railway train, column number information (operation information) thereof, and a boarding rate thereof from the vehicle information control device. Here, the column number information includes information such as when and at which station the railway train is expected to arrive.

[0034] The vehicle processing module (MO26) calculates congestion status information based upon the passenger information acquired from the passenger information accumulation module (MO24) and the vehicle information acquired from the vehicle information acquisition module (MO25), and is a program that stores the congestion status information in the congestion status table (TB20).

[0035] In practice, the vehicle processing module (MO26) confirms that the identification numbers of the acquired vehicle information are not overlapped, and for example, deletes old information when the identification

numbers thereof are overlapped, and then counts the number of people expected to get off from each door at each station. The vehicle processing module (MO26) refers to the boarding rate acquired by the vehicle information acquisition module (MO25) with respect to the boarding rate of the vehicle in which each door is installed.

[0036] The congestion status table (TB20) is a table used for grasping the congestion status and has a configuration illustrated in Fig. 6. In the congestion status table (TB 20), one record (a row) corresponds to data of one door.

[0037] In the congestion status table (TB20), each record is respectively divided into a vehicle column TB21, a boarding rate column TB22, a door position column TB23, and a column for the number of people expected to get off at each station TB24.

[0038] Then, the number (NU) of the vehicle in which each door is installed is stored in the vehicle column TB21; the boarding rate (RA) of the vehicle in which each door is installed is stored in the boarding rate column TB22; and the number (PO) indicating the position of each door is stored in the door position column TB23.

[0039] In the column for the number of people expected to get off at the station TB24, the number of people expected to get off at each station (A station (AST), B station (BST), and Z station (ZST)) from each door is classified, and is represented by, for example, symbols such as ⊙, ○, △, and X, thereby being stored. Here, for example, ⊙ indicates 10 people or more; ○ indicates 5 to 9 people; △ indicates 1 to 4 people; and X indicates that there is no person getting off.

[0040] The vehicle processing module (MO26) transmits the classified number of people expected to get off which is the information on the column for the number of people expected to get off at the station TB24 as the congestion status information of each door to the in-vehicle guidance display device (DS11) corresponding to each door. An in-vehicle display screen 40 displayed on the in-vehicle guidance display device (DS11) is illustrated in Fig. 7.

[0041] The in-vehicle display screen 40 includes a vehicle information display area 41, an area for displaying the number of people expected to get off 42, and an attention attracting information display area 43. In the vehicle information display area 41, the destination of the railway train, the number of the vehicle, and the information on the closest arrival station are displayed. The pieces of information described above are information acquired directly from the vehicle information control device by the in-vehicle guidance display device (DS11) or information held in advance by the in-vehicle guidance display device (DS11).

[0042] The information on the number of people expected to get off is displayed in the area for displaying the number of people expected to get off 42. For example, when the column for the number of people expected to get off at the station TB24 is ⊙, it is displayed that "we ask people near the door to get off once and get on again", and in the case of ○, it is displayed that "five or more people are expected to get off from this door, please make way."

[0043] The information displayed in the attention attracting information display area 43 may be the information acquired directly from the vehicle information control device by the in-vehicle guidance display device (DS11) or the information held in advance by the in-vehicle guidance display device (DS11), and may be changed depending on weather information.

[0044] The getting-off notification information receiving module (MO33) is a program that wirelessly receives premises congestion status information from the getting-off notification information transmission module (MO27). The getting-off notification information transmission module (MO27) generates the premises congestion status information based upon the congestion status information acquired from the vehicle processing module (MO26) and the column number information acquired from the vehicle information acquisition module (MO25).

[0045] The getting-off notification information processing module (MO34) is a program for acquiring the premises congestion status information received by the getting-off notification information receiving module (MO33) and for transmitting the premises congestion status information to the portable terminal 28 owned by a user staying in the premises of the station and out of the station who does not get on the railway vehicle.

[0046] The getting-off notification information processing module (MO34) transmits the premises congestion status information of each door to the premises guidance display device (DS35) corresponding to each door. The premises guidance display device (DS35) performs display based upon the content of the column for the number of people expected to get off at the station TB24. For example, a screen such as the area for displaying the number of people expected to get off 42 is displayed.

(3) Congestion Mitigation Processing

[0047] Fig. 8 illustrates a flow of specific processing of congestion mitigation processing to be executed in the control device 20 that generates the congestion status information.

[0048] In practice, the control device 20 periodically acquires vehicle information from the portable terminal 28 and the vehicle information control device until a distance between the railway vehicle on which the control device 20 is mounted and the next stopping station becomes equal to or less than a predetermined distance. First, the vehicle processing module (MO26) receives passenger information from the getting-off door position estimating module (MO15) (SP11), and acquires vehicle information from the vehicle information control device (SP12).

[0049] Next, the vehicle processing module (MO26) calculates the distance to the next station from the vehicle processing vehicle information, and determines whether

or not the distance to the next station is equal to or less than the predetermined distance (SP13). Next, when acquiring a negative result by the determination, the vehicle processing module (MO26) returns to step SP11, after which the processing of step SP11 and step SP12 is repeated until a positive result is acquired in step SP13. The above-described information up to immediately before the stop can be acquired from the portable terminal and the vehicle information control device by repeating the above-described processing.

[0050] When acquiring the positive result in step SP13 since the railway vehicle and the stop station approach each other, the vehicle processing module (MO26) counts, for each door, the number of identification number columns TB12 in which the getting-off expected station column TB13, the getting-on vehicle column TB14, and the getting-off expected door column TB15 in the passenger information table (TB10) all coincide with each other (SP14).

[0051] Next, the vehicle processing module (MO26) classifies the counted number of identification number columns TB12 into an arbitrary number and classifies the number of people expected to get off (SP15) . Here, for example, ⊙ is classified as 10 or more people, ○ is classified as 5 to 9 people, △ is classified as 1 to 4 people, and X is classified by indicating that there is no person getting off.

[0052] Next, the vehicle processing module (MO26) transmits the classified number of people expected to get off of each door to the in-vehicle guidance display device (DS11) corresponding to the door (SP16). The vehicle processing module (MO26) transmits the congestion status to the getting-off notification information processing module (MO34) (SP17).

(4) Effect of the Embodiment

[0053] As described above, in the congestion mitigation system 1 according to the embodiment, it is possible to inform a user about the congestion status for each door at a timing of arriving at a station by determining the number of people getting on and off for each door which is an entrance and an exit used for the user to enter and exit from a predetermined space such as the inside of the railway vehicle. It is possible to inform a user not getting on in the station premises about the congestion status by using the premises guidance display device (DS35) . A user who has not arrived at the station can be informed about the congestion status by using the portable terminal 28.

[0054] Therefore, according to the congestion mitigation system 1, it is possible to efficiently cope with a transportation device provided with a plurality of entrances and exits.

(5) Other Embodiments

[0055] In the embodiment described above, the case in which the data is transmitted from the control device 20 to each of the in-vehicle guidance display devices (DS11) in the vehicle every time the railway train stops at the train station is described, but the present invention is not limited thereto, and the control device 20 may transmit the data only to the in-vehicle guidance display device (DS11) installed in the vehicle whose boarding rate exceeds a predetermined value by referring to the boarding rate.

[0056] As illustrated in Fig. 9, step SP21 for determining whether or not the boarding rates of the respective vehicles are all equal to or greater than the predetermined value is added between step SP13 and step SP14. Only when the positive result is obtained by the above-described determination, the vehicle processing module (MO26) performs the processing of steps SP14 to SP16, and then transmits the classified number of people expected to get off to the in-vehicle guidance display device (DS11).

[0057] The display of the in-vehicle guidance display device (DS11) can be limited in a non-congested section and in a time zone where the number of users is small by adding the processing of step SP21, thereby reducing an energy consumption amount used by the railway vehicle.

[0058] In the above-described embodiment, the case in which the communication device 5 is installed on a ceiling and the control device 20 is installed under the floor is described, but the present invention is not limited thereto, and the communication device 5 may be installed on the side wall or the control device 20 may be installed near a steering wheel.

[0059] In the above-described embodiment, the case in which the respective communication devices 5 are associated with a plurality of doors installed in the respective vehicles of the railway vehicle on a one-to-one basis is described, but the present invention is not limited thereto, and one communication device 5 may be installed in each vehicle by applying a directional antenna to the communication device 5.

[0060] In the above-described embodiment, the case in which the positional information is measured by the speed generator and the boarding rate is measured by the load compensating device is described, but the present invention is not limited thereto, and the positional information may be measured by using global positioning system (GPS), and the boarding rate may be measured by using data of an automatic ticket gate.

[0061] In the above-described embodiment, the case in which the getting-off station information is inputted by a user from the portable terminal 28 is described, but the present invention is not limited thereto, and the portable terminal 28 may acquire the getting-off station information by referring to information on an IC ticket by using an IC reader.

[0062] In the above-described embodiment, the case in which the premises guidance display device (DS35) displays information on the screen in the same manner

as that of the in-vehicle guidance display device (DS11) is described, but the present invention is not limited thereto, and a color of an LED on a home door may be changed.

[0063] In the above-described embodiment, the case in which the respective doors in the railway vehicle are associated with the premises guidance display devices (DS35) is described, but the present invention is not limited thereto, and only one premises guidance display device (DS35) may be installed near the ticket gate, and pieces of information on the respective doors may be collectively displayed.

[0064] In the above-described embodiment, the case in which the information is displayed on the in-vehicle guidance display device (DS11) and the premises guidance display device (DS35) is described, but the present invention is not limited thereto, and the information may be notified by voice using another device without using the in-vehicle guidance display device (DS11) and the premises guidance display device (DS35).

Reference Signs List

[0065]

1: congestion mitigation system
5: communication device
12, 21, 31: CPU
13, 22, 32: memory
20: control device
28: portable terminal
30: premises guidance device
DS11: in-vehicle guidance display device
DS35: premises guidance display device
MO14: getting-off station information receiving module
MO15: getting-off door position estimating module
MO24: passenger information accumulation module
MO25: vehicle information acquisition module
MO26: vehicle processing module
MO27: getting-off notification information transmission module
MO33: getting-off notification information receiving module
MO34: getting-off notification information processing module

Claims

1. A management system which manages behavior of a plurality of people in a predetermined area where each of the plurality of people can enter and exit through a plurality of gates, the system comprising:

a receiver which receives information outputted from a terminal device of each of the plurality of people; and

a control device for the management, wherein the control device
determines a timing at which each of the plurality of people exits from the predetermined area based upon the information,
determines a gate to be used when each of the plurality of people exits from the predetermined area from among the plurality of gates based upon a positional relationship between the terminal device of each of the plurality of people and the plurality of gates,
generates exiting person information on a person exiting from the predetermined area for each of the plurality of gates, and
notifies the exiting person information.

2. The management system according to claim 1, wherein
the predetermined area is the inside of a vehicle and the vehicle includes a plurality of opening and closing doors as the gate, and
the control device acquires information on a getting-off station from the terminal device, and determines the timing based upon an operation of the vehicle.

3. The management system according to claim 2, wherein
the control device outputs the exiting person information via a display device, and
the display device is installed in the vehicle.

4. The management system according to claim 2, wherein
the control device determines that the opening and closing door at a position closest to the terminal device from among the plurality of opening and closing doors is to be used when a person carrying the terminal device gets off.

5. The management system according to claim 4, wherein
the control device determines the opening and closing door to be used when the person carrying the terminal device gets off among from the plurality of opening and closing doors based upon signal intensity received from the terminal device by the receiver.

6. The management system according to claim 2, further comprising:

a station premises device including a display device, wherein
the control device outputs the exiting person information to the station premises device via the display device.

7. The management system according to claim 2, wherein

the control device determines a mode for outputting the exiting person information to a display device based upon a boarding rate of the vehicle.

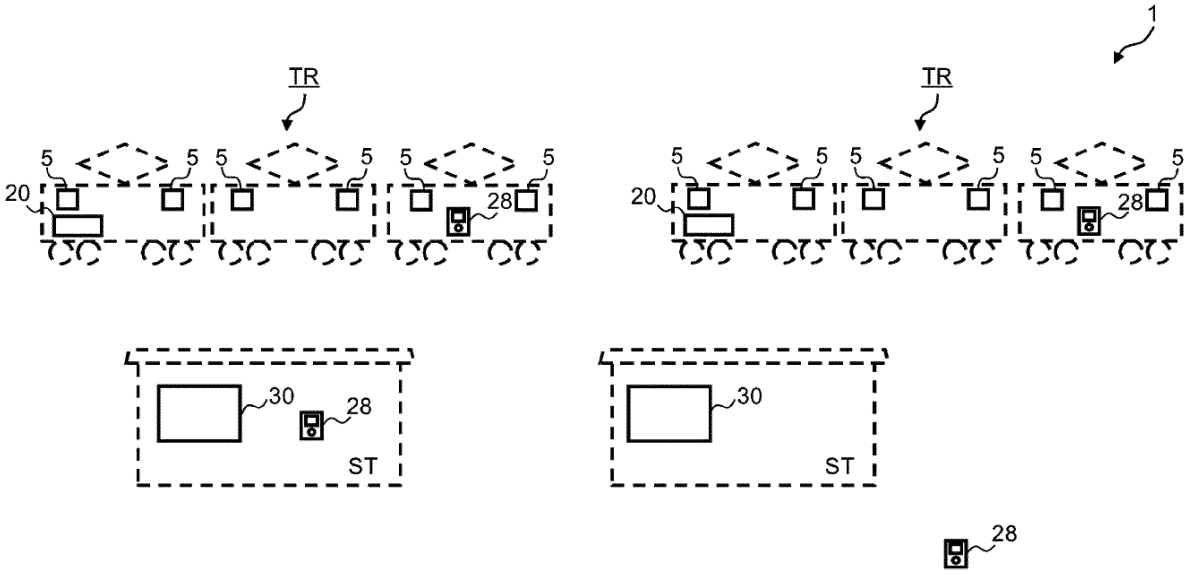
8. The management system according to claim 7, wherein
the control device does not output the exiting person information to the display device when the boarding rate is equal to or less than a predetermined value.

9. A management device which manages behavior of a plurality of people in a predetermined area where each of the plurality of people can enter and exit through a plurality of gates, the device comprising:

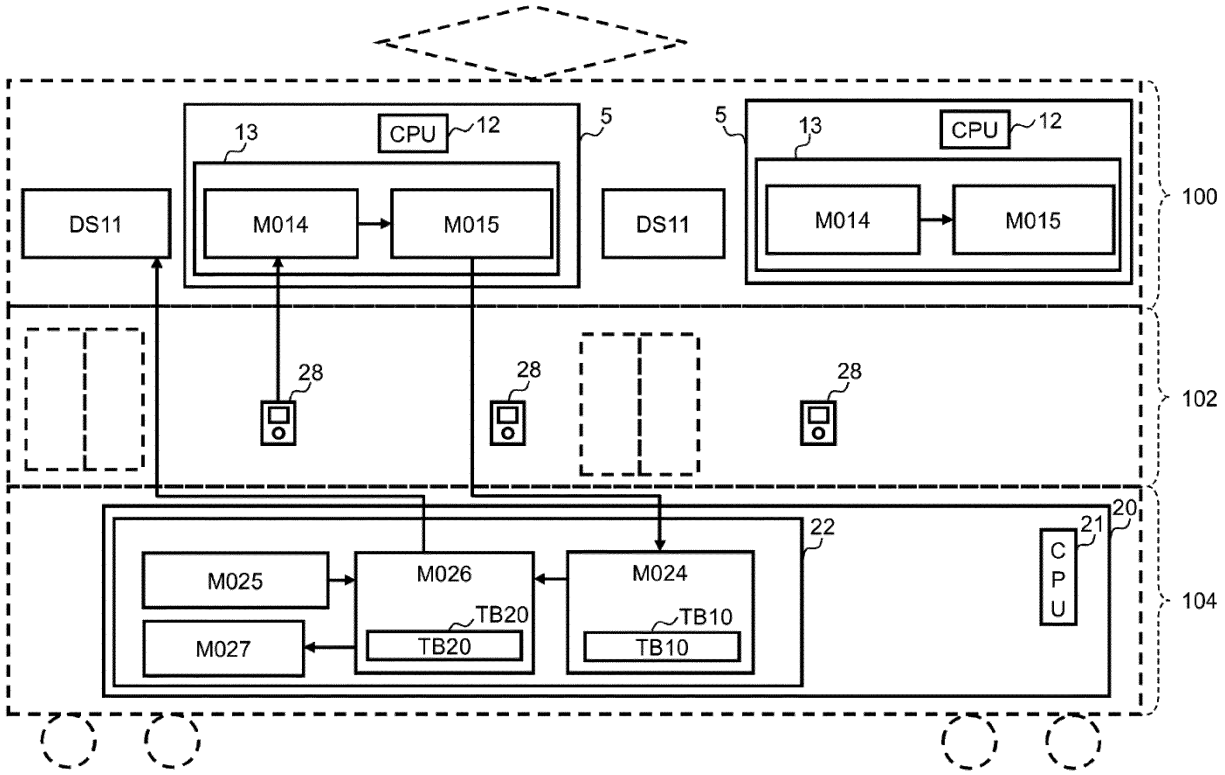
a receiver which receives information outputted from a terminal device of each of the plurality of people, wherein
the management device
determines a timing at which each of the plurality of people exits from the predetermined area based upon the information,
determines a gate to be used when each of the plurality of people exits from the predetermined area from among the plurality of gates based upon a positional relationship between the terminal device of each of the plurality of people and the plurality of gates,
generates exiting person information on a person exiting from the predetermined area for each of the plurality of gates, and
notifies the exiting person information.

10. A management method in which behavior of a plurality of people is managed by a management device in a predetermined area where each of the plurality of people can enter and exit through a plurality of gates, wherein
the management device
receives information outputted from a terminal device of each of the plurality of people,
determines a timing at which each of the plurality of people exits from the predetermined area based upon the information,
determines a gate to be used when each of the plurality of people exits from the predetermined area from among the plurality of gates based upon a positional relationship between the terminal device of each of the plurality of people and the plurality of gates,
generates exiting person information on a person exiting from the predetermined area for each of the plurality of gates, and
notifies the exiting person information.

[FIG. 1]



[FIG. 2]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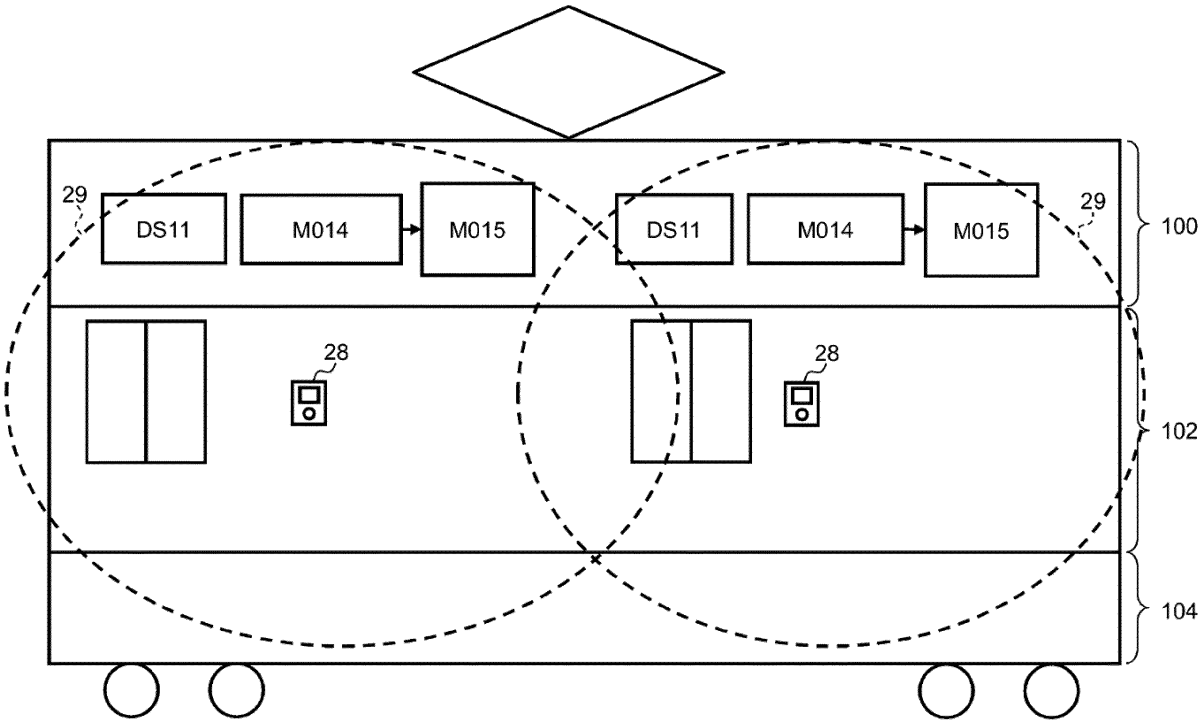
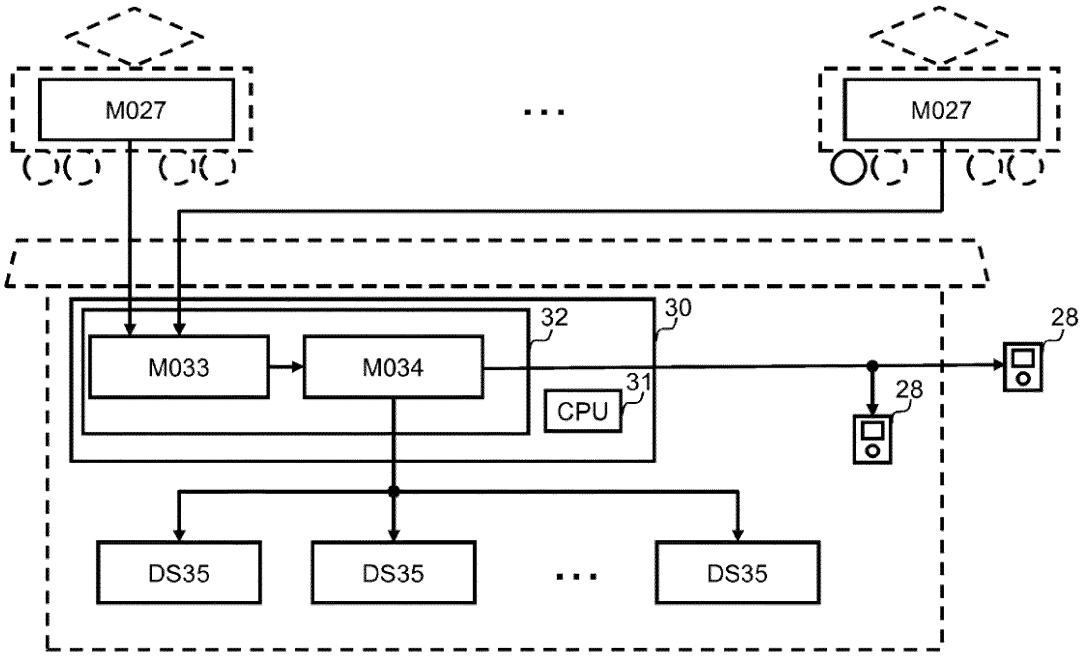
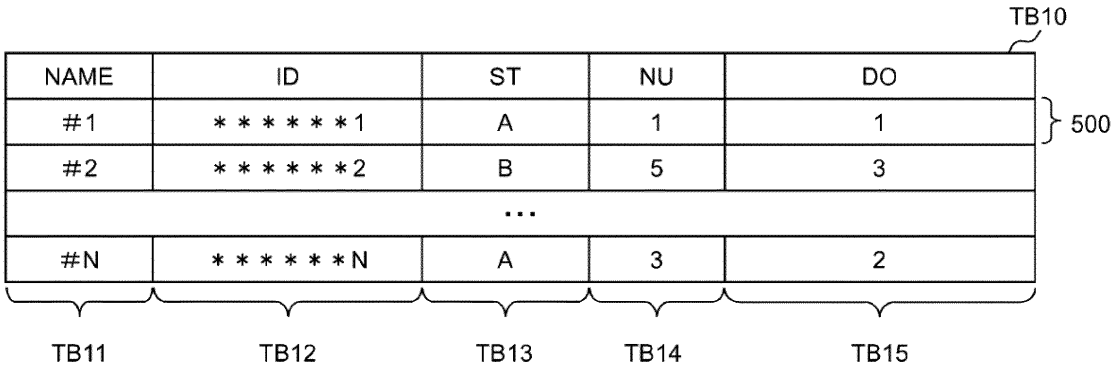
[FIG. 3]



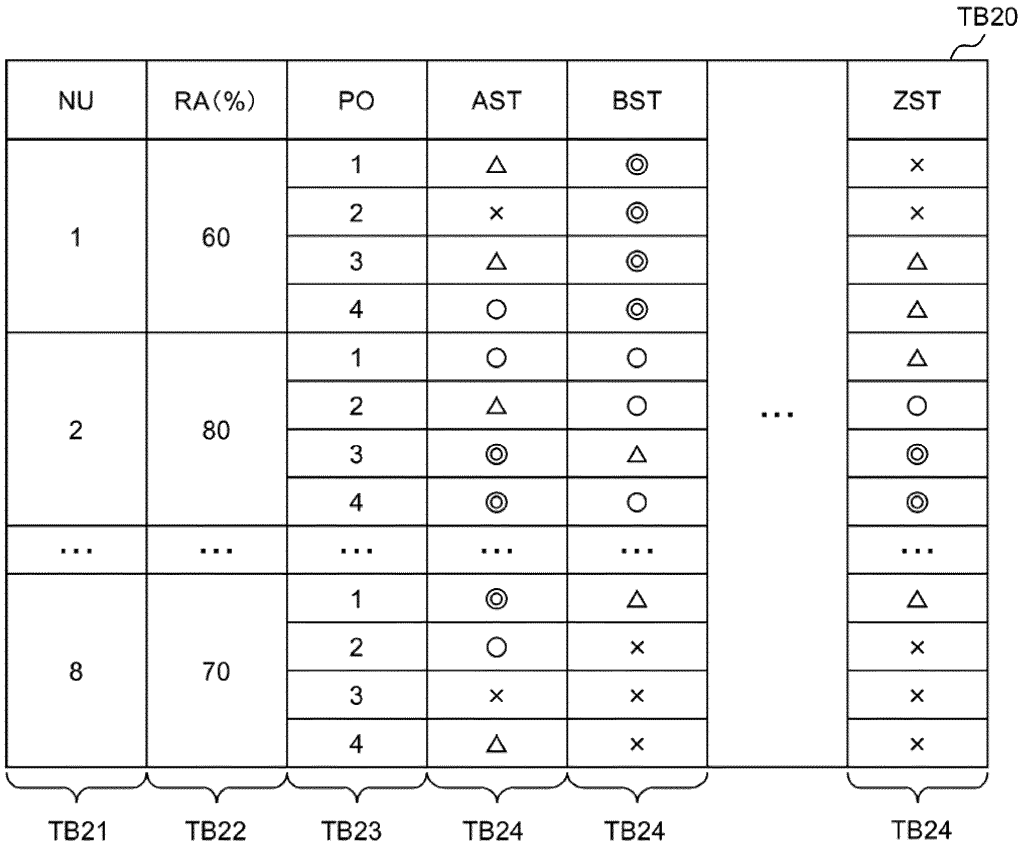
[FIG. 4]



[FIG. 5]


TB10
NAME
ID
ST
NU
DO
#1
＊＊＊＊＊＊1
A
1
1
500
#2
＊＊＊＊＊＊2
B
5
3
...
#N
＊＊＊＊＊＊N
A
3
2
TB11
TB12
TB13
TB14
TB15

[FIG. 6]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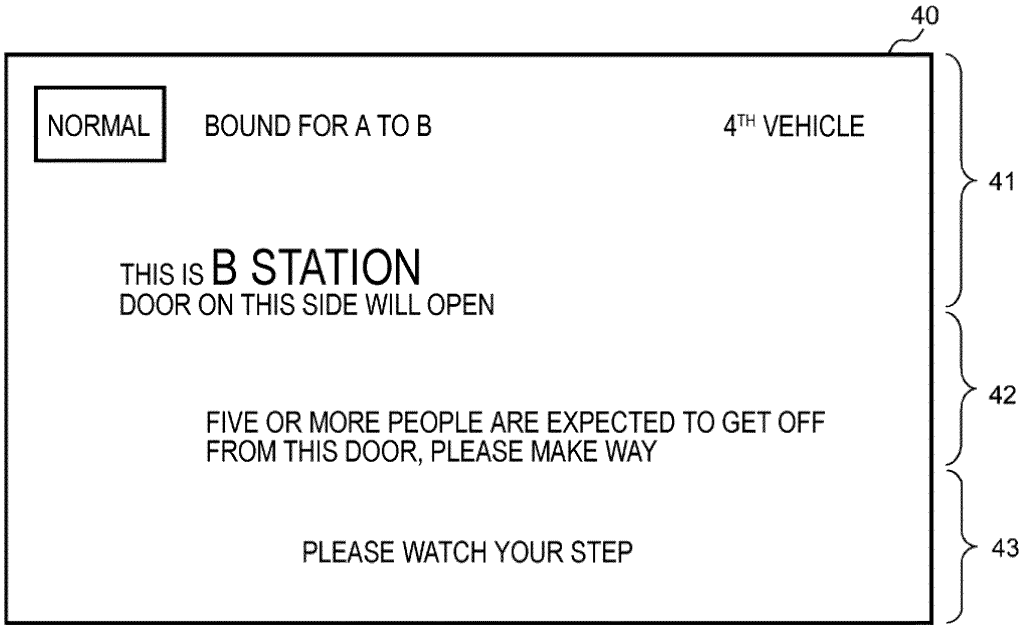
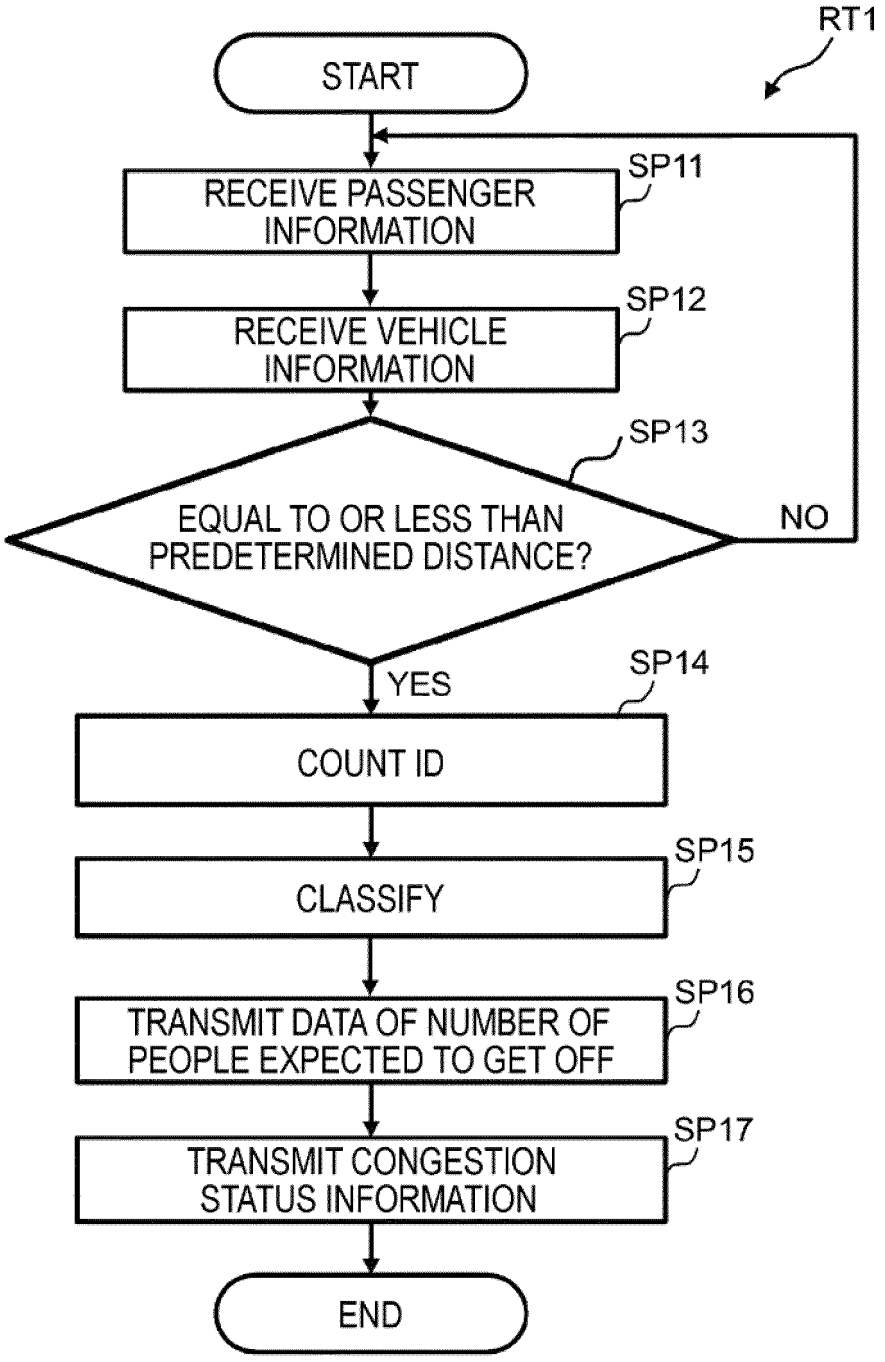
NU
RA(%)
PO
AST
BST
ZST
1
60
1
2
3
4
2
80
1
2
3
4
8
70
1
2
3
4
TB21
TB22
TB23
TB24
TB24
TB24

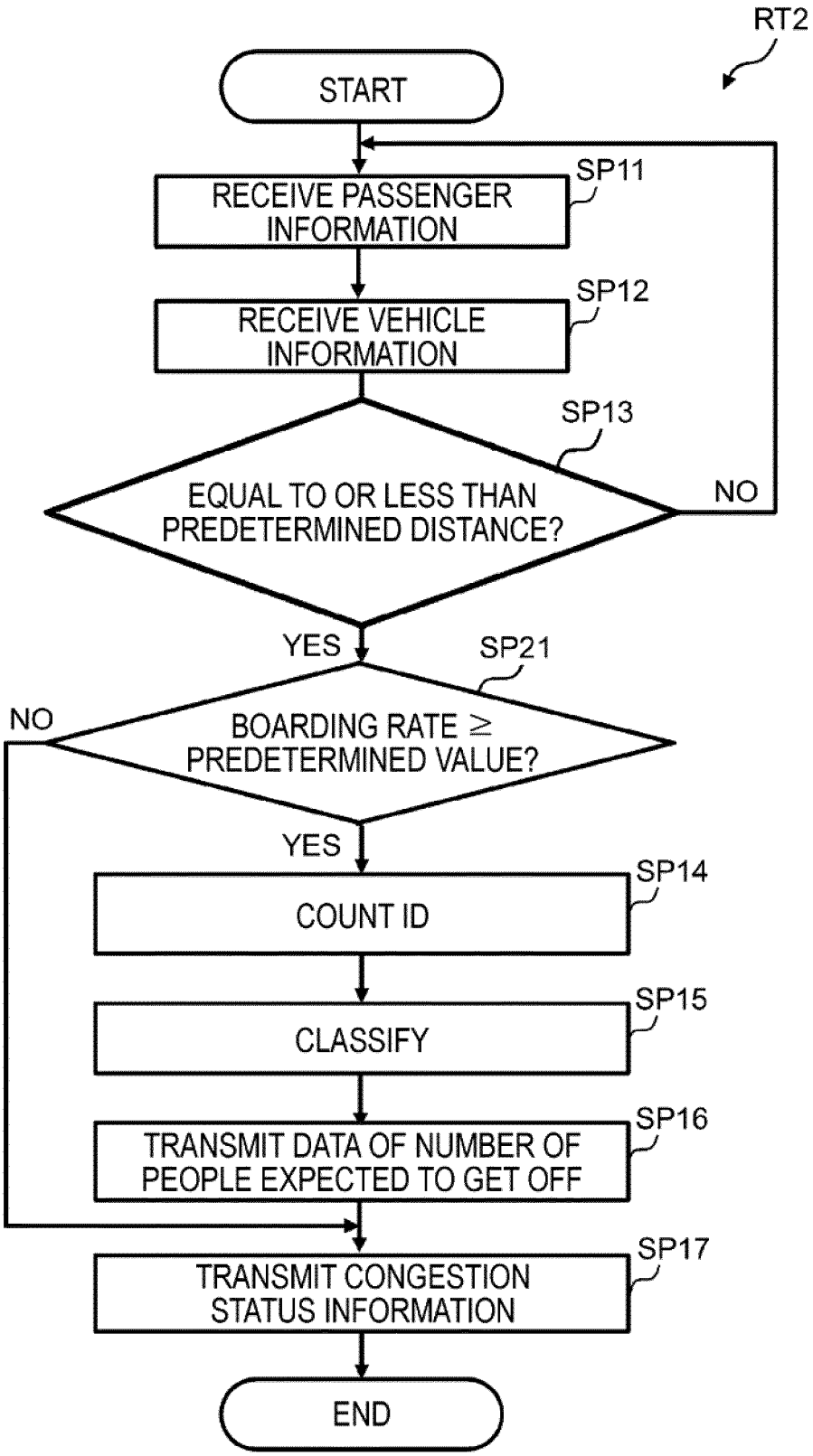
[FIG. 7]


40
NORMAL
BOUND FOR A TO B
4TH VEHICLE
41
THIS IS B STATION
DOOR ON THIS SIDE WILL OPEN
42
FIVE OR MORE PEOPLE ARE EXPECTED TO GET OFF
FROM THIS DOOR, PLEASE MAKE WAY
PLEASE WATCH YOUR STEP
43

[FIG. 8]


RT1
START
RECEIVE PASSENGER INFORMATION
SP11
RECEIVE VEHICLE INFORMATION
SP12
EQUAL TO OR LESS THAN PREDETERMINED DISTANCE?
SP13
NO
YES
COUNT ID
SP14
CLASSIFY
SP15
TRANSMIT DATA OF NUMBER OF PEOPLE EXPECTED TO GET OFF
SP16
TRANSMIT CONGESTION STATUS INFORMATION
SP17
END

[FIG. 9]


RT2
START
SP11
RECEIVE PASSENGER INFORMATION
SP12
RECEIVE VEHICLE INFORMATION
SP13
EQUAL TO OR LESS THAN PREDETERMINED DISTANCE?
NO
YES
SP21
BOARDING RATE ≥ PREDETERMINED VALUE?
NO
YES
SP14
COUNT ID
SP15
CLASSIFY
SP16
TRANSMIT DATA OF NUMBER OF PEOPLE EXPECTED TO GET OFF
SP17
TRANSMIT CONGESTION STATUS INFORMATION
END

INTERNATIONAL SEARCH REPORT

International application No.
PCT/JP2018/001691

A. CLASSIFICATION OF SUBJECT MATTER
Int.Cl. B61L25/02(2006.01)i, B61D37/00(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
Int.Cl. B61L25/02, B61D37/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Published examined utility model applications of Japan	1922-1996
Published unexamined utility model applications of Japan	1971-2018
Registered utility model specifications of Japan	1996-2018
Published registered utility model applications of Japan	1994-2018

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	JP 2009-161080 A (NEC SAITAMA, LTD.) 23 July 2009, paragraph [0010] (Family: none)	1-2, 4, 6, 9-10 3, 5, 7-8
A	JP 2012-197058 A (SONY CORP.) 18 October 2012, entire text, all drawings & US 2015/0338431 A1, entire text, all drawings & CN 102693354 A	1-10
A	JP 2010-152743 A (FUJITSU LTD.) 08 July 2010, paragraphs [0012]-[0179] (Family: none)	1-10
A	JP 2005-231431 A (HITACHI SOFTWARE ENGINEERING CO., LTD.) 02 September 2005, paragraphs [0011]-[0019] (Family: none)	1-10

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
05 April 2018 (05.04.2018)	17 April 2018 (17.04.2018)

Name and mailing address of the ISA/	Authorized officer
Japan Patent Office 3-4-3, Kasumigaseki, Chiyoda-ku, Tokyo 100-8915, Japan	Telephone No.

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Patent documents cited in the description

- JP 2008065759 A **[0004]**
- JP 2005081993 A **[0004]**