

TITLE OF THE INVENTION

DISPLAY CONTENT MANAGEMENT DEVICE AND DISPLAY CONTENT
MANAGEMENT SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001]

The present invention relates to a display content management device and a display content management system.

2. Description of the Related Art

[0002]

A car of a conventional elevator is provided with an in-car display device for displaying the current position of the elevator and the like. The in-car display device is often used as a display device for displaying not only the current position of the elevator but also various content such as a weather forecast and the latest news. Examples of the various content to be displayed on the in-car display device include a message for users of the elevator and the like. The message for the users of the elevator is created for the purpose of, for example, comfortable use or safe operation of the elevator.

[0003]

Specifically, through a notification of the next scheduled inspection date of the elevator as a message for

the users of the elevator, the users of the elevator are notified that the elevator is out of service for that period, for example. Further, for example, through display of precautions for use of the elevator such as a message for discouraging users from rush riding, the users of the elevator are encouraged to improve their manners, and the like.

[0004]

In general, it is possible for a caretaker of a building where the elevator is in operation (hereinafter, also referred to as an elevator caretaker) to change various content to be displayed on the in-car display device. Specifically, the elevator caretaker contacts an elevator maintenance company by telephone to request a change in display content on the in-car display device, changes the display content via a website made open to public by the elevator maintenance company, or the like.

[0005]

For example, JP 2015-217991 A discloses a display device of an elevator including a display part that displays a scheduled inspection date of the elevator sent from an elevator maintenance company, an operation part on which an operation of accepting the scheduled inspection date displayed on the display part and an operation of rejecting the scheduled inspection date are performed.

SUMMARY OF THE INVENTION

[0007]

In many cases, a manner where the elevator caretaker can change various contents to be displayed on the in-car display device and select the change timing as needed is employed. Such a manner may make the elevator caretaker difficult to determine whether the display content for the in-car display device is suitable or cause the elevator caretaker to forget the timing at which the display content is changed. In particular, an elevator caretaker belonging to a building maintenance company or the like who takes care of a large number of elevators often fails to sufficiently manage changes in content to be displayed on the in-car display device. The reason why the elevator caretaker fails to sufficiently manage changes includes that a burden on the elevator caretaker for examining the content to be displayed on the in-car display device, the change timing of the content, and the like is large.

[0008]

The present invention has been made to solve the above problems. It is therefore an object of the present invention to reduce a burden on an elevator caretaker through examination of content to be displayed on an in-car display device and change timing of the content.

[0009]

In order to solve the above problems, for example, a structure recited in the claims is employed. The present invention includes a plurality of means for solving the above problems, and one of the means is a display content management device of the present invention that manages display content to be displayed on an in-car display device of an elevator and includes an analyzer and a communication part. The analyzer analyzes collected data on the elevator containing operation data on the elevator to determine recommended display content that is recommended for display on the in-car display device based on a result of the analysis. The communication part sends the recommended display content to a terminal device operated by a user who serves as a caretaker of the elevator.

[0010]

According to the present invention, it is possible to reduce a burden on the elevator caretaker through examination of content to be displayed on the in-car display device and change timing of the content.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011]

Fig. 1 is a block diagram showing main functional

blocks of a display content management system according to an embodiment of the present invention;

Fig. 2 is a hardware block diagram of a structure where each device constituting the display content management system according to the embodiment of the present invention includes a computer;

Fig. 3 is a diagram showing an example of a data structure of a failure data storage area according to the embodiment of the present invention;

Fig. 4 is a diagram showing an example of a data structure of an operation data storage area according to the embodiment of the present invention;

Fig. 5 is a diagram showing an example of a data structure of a determination value storage area according to the embodiment of the present invention;

Fig. 6 is a diagram showing an example of a data structure of a display content data storage area according to the embodiment of the present invention;

Fig. 7 is a diagram showing a display example of a receipt notification message of recommended display content according to the embodiment of the present invention;

Fig. 8 is a diagram showing a display example of a receipt notification message of an improvement result report based on a change in display content according to the embodiment of the present invention;

Fig. 9 is a diagram showing an example of an in-car display device display content change screen according to the embodiment of the present invention;

Fig. 10 is a diagram showing an example of an in-car display device display content determination screen according to the embodiment of the present invention;

Fig. 11 is a diagram showing an example of an improvement result report on operation data display screen according to the embodiment of the present invention; and

Fig. 12 is a flowchart showing an example of a flow of a display content management method carried out by the display content management system according to the embodiment of the present invention.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0012]

A description will be given below of a display content management system according to an embodiment of the present invention with reference to the drawings, but the present invention is not limited to the following specific examples.

[0013]

[Structure of display content management system]

First, a description will be given of a structure of the display content management system according to the

present embodiment with reference to Fig. 1. Fig. 1 is a block diagram showing main functional blocks of a display content management system 100 of the present embodiment.

[0014]

As shown in Fig. 1, the display content management system 100 includes an elevator 1, a control center device 2 (an example of a display content management device), and a terminal device 3 to be operated by a user.

[0015]

The elevator 1 is an elevator delivered to a customer by an elevator maintenance company that manages the control center device 2. The control center device 2 is a device to be managed by the elevator maintenance company and performs maintenance of elevators delivered to their respective customers, including the elevator 1 shown in Fig. 1. In the present embodiment, the control center device 2 further manages (changes) display content on an in-car display device 13 of the elevator 1. The terminal device 3 is a device such as a mobile phone terminal, a smartphone, a personal computer (PC), or the like and is operated by the user who serves as a caretaker of the elevator 1. The control center device 2 and the elevator 1, and the control center device 2 and the terminal device 3 are connected to each other over a public network 4 such as a public IP network.

[0016]

The elevator 1 includes a communication part 11, a controller 12, the in-car display device 13, and the like. Note that, in Fig. 1, for the sake of simplifying the explanation, only components necessary for changing the display content on the in-car display device 13 of the elevator 1 are shown.

[0017]

The communication part 11 controls communication established with the control center device 2. For example, the communication part 11 sends operation data or failure data on the elevator 1 to the control center device 2 and receives a remote control command or the like sent from the control center device 2.

[0018]

The controller 12 controls a function of each component constituting the elevator 1 such as the communication part 11 and the in-car display device 13, the component including, for example, a central processing unit (CPU).

The in-car display device 13 is, for example, an indicator including, for example, a liquid crystal panel or the like and is installed in a car (not shown) of the elevator 1. The in-car display device 13 displays various content such as floor information, notification of the next

scheduled inspection date of the elevator, and a message for the user of the elevator 1.

[0019]

The control center device 2 includes a communication part 21, a data storage 22, and a controller 23.

The communication part 21 controls communication established with the elevator 1 and the terminal device 3 over the public network 4. The data storage 22 includes a failure data storage area 22a, an operation data storage area 22b, a scheduled work data storage area 22c, a customer data table 22d, a determination value storage area 22e, and a display content data storage area 22f.

[0020]

In the failure data storage area 22a, the failure data on the elevator 1 is stored. In the operation data storage area 22b, the operation data on the elevator 1 is stored. In the scheduled work data storage area 22c, data on scheduled work to be conducted by a worker belonging to the elevator maintenance company is stored. In the customer data table 22d, information on a customer to whom the elevator has been delivered is stored with the data associated with elevator identification information (an elevator ID to be described later). In the determination value storage area 22e, a determination value serving as a threshold for detecting various abnormalities of the

elevator 1 is stored. In the display content data storage area 22f, display content data to be displayed on the in-car display device 13 of the elevator 1 is stored.

[0021]

The controller 23 includes a push notification controller 23a, an analyzer 23b, and a command controller 23c. The push notification controller 23a sends a push notification to the terminal device 3 operated by the user. Examples of the push notification sent to the terminal device 3 include a notification message of recommended display content for the in-car display device 13, a report message of an improvement result based on a change in display content, and the like, such messages being given to the customer who serves as a caretaker of the elevator 1.

[0022]

The analyzer 23b includes a notification target extractor 23b1, a calculator 23b2, and the like. The calculator 23b2 analyzes various pieces of data stored in the data storage 22. The notification target extractor 23b1 extracts, based on a result of the analysis made by the calculator 23b2, a customer to whom the push notification is sent from the customer data table 22d of the data storage 22 and determines the recommended display content to be sent to the customer.

[0023]

The command controller 23c creates a command for changing the content to be displayed on the in-car display device 13 of the elevator 1 (hereinafter, simply referred to as a "display content change command for the in-car display device 13").

[0024]

The terminal device 3 includes a communication part 31, a controller 32, and an input and output part 33. The communication part 31 controls communication established with the control center device 2 over the public network 4. The controller 32 includes, for example, a CPU, and controls functions of the communication part 31 and the input and output part 33 of the terminal device 3. For example, when a display change command for the in-car display device is sent from the control center device 2, the controller 32 changes the content to be displayed on the in-car display device 13 based on the display change command for in-car display device.

[0025]

The input and output part 33 includes an input part (not shown) to which a user operation is input, and a display part (not shown) such as a liquid crystal display. When the terminal device 3 is a smartphone, a mobile phone terminal, or the like, the input part is a touch sensor, a key, or the like. When the terminal device 3 is a PC or

the like, the input part is a mouse, a keyboard, or the like. The display part is a liquid crystal panel or the like.

[0026]

On a screen of an output part of the input and output part 33, the notification message of recommended display content for the in-car display device 13 sent through the push notification from the control center device 2, the report message of an improvement result based on a change in display content, or the like is displayed.

[0027]

Herein, a description will be given of a hardware structure of each device constituting the display content management system 100 with reference to Fig. 2. Fig. 2 is a hardware block diagram of a structure where each device constituting the display content management system 100 includes a computer C.

[0028]

The computer C includes a CPU C1, a read only memory (ROM) C2, and a random access memory (RAM) C3 that are each connected to a bus C4. Further, the computer C includes a display part C5, an operation part C6, a non-volatile storage C7, and a network interface C8 that are each connected to the bus C4.

[0029]

The CPU C1 loads, into the RAM C3, a predetermined program code from the ROM C2 in which program codes of software for implementing various functions of the computer C are stored and executes the program code. At this time, variables and parameters generated in the course of arithmetic processing performed by the CPU C1 are also temporarily written to the RAM C3.

[0030]

The display part C5 includes, for example, a display device such as a liquid crystal display and displays information such as a result of processing performed by the computer C on a display screen to notify the user of the information. The operation part C6 includes, for example, an operation device such as a keyboard and a mouse and allows the user to perform a predetermined input operation and instruction on the computer C.

[0031]

The non-volatile storage C7 includes, for example, a hard disk drive (HDD), a solid state drive (SSD), a flexible disk, an optical disk, a magneto-optical disk, a CD-ROM, a CD-R, a magnetic tape, a storage device such as non-volatile memory, or the like. In the non-volatile storage C7, various programs for putting the computer C into operation are stored together with an operating system (OS) and various parameters.

[0032]

The network interface C8 includes, for example, a network interface card (NIC). The computer C is capable of sending and receiving various pieces of data over a local area network (LAN), a dedicated line, or the like connected to a terminal of the network interface C8.

[0033]

In the present embodiment, the communication part 11 in the elevator 1 is included in the network interface C8, the controller 12 is included in the CPU C1, and the in-car display device 13 is included in the display part C5. Then, the CPU C1 loads, into the RAM C3, a program code for changing display content stored in the ROM C2 and executes the program code to control to change the display content on the in-car display device 13 in the elevator 1.

[0034]

Further, the communication part 21 in the control center device 2 is included in the network interface C8, the controller 23 is included in the CPU C1, and the data storage 22 is included in the ROM C2. Then, the CPU C1 loads, into the RAM C3, the program code for changing display content stored in the ROM C2 and executes the program code to control to make notification of and change the display content on the in-car display device 13 in the elevator 1.

[0035]

Further, the communication part 31 in the terminal device 3 is included in the network interface C8, the controller 32 is included in the CPU C1, the input part of the input and output part 33 is included in the operation part C6, and the output part of the input and output part 33 is included in the display part C5. Then, the CPU C1 loads, into the RAM C3, the program code for changing display content stored in the ROM C2 and executes the program code to display, on the display part C5, content of the push notification sent from the control center device 2, a screen for changing display content, and the like.

[0036]

[Data structure of failure data storage area]

Next, a description will be given of a data structure of the failure data storage area 22a stored in the data storage 22 of the control center device 2 of the present embodiment with reference to Fig. 3. Fig. 3 is a diagram showing an example of the data structure of the failure data storage area 22a.

[0037]

As shown in Fig. 3, the failure data storage area 22a includes fields of "elevator ID", "failure content", and "detection date and time". In the "elevator ID" field, the elevator ID serving as an identifier for identifying

each elevator delivered to a corresponding customer is stored. In the "failure content" field, failure content contained in the failure data sent from the elevator is stored. In the "detection date and time" field, information on the date and time at which a failure is detected in the elevator is stored in the format of YYYY/MM/DD hh:mm:ss.

[0038]

In the example shown in Fig. 3, for an elevator assigned with an elevator ID "12345678", records representing that a door opening/closing abnormality occurred at 10:00 on March 1, 2019, and a safety device was tripped at 2:00 on March 11, 2019 are stored in the failure data storage area 22a. Further, for the elevator assigned with the elevator ID "12345678", records representing that a door opening/closing abnormality occurred at 9:00 on March 12, 2019, and a door power supply abnormality occurred at 22:15 on February 12, 2019 are stored in the failure data storage area 22a. Furthermore, for an elevator assigned with an elevator ID "98765432", records representing that the safety device was tripped at 16:30 on March 8, 2019, and a power supply abnormality occurred at 19:00 on March 20, 2019 are stored in the failure data storage area 22a.

[0039]

[Data structure of operation data storage area]

Next, a description will be given of the operation data storage area 22b stored in the data storage 22 of the control center device 2 of the present embodiment with reference to Fig. 4. Fig. 4 is a diagram showing an example of a data structure of the operation data storage area 22b.

[0040]

As shown in Fig. 4, the operation data storage area 22b includes fields of "elevator ID", "travel time (hour)", "door opening/closing frequency for each floor (first floor)" and "door opening/closing frequency for each floor (second floor)". In the "elevator ID" field, the elevator ID is stored. In the "travel time (hour)" field, a travel time of the elevator identified by the elevator ID is stored on an hourly basis.

[0041]

In the "door opening/closing frequency for each floor (first floor)" field, an opening/closing frequency of a door of the car of the elevator (or a landing door) (neither shown) when the elevator identified by the elevator ID stops at the first floor of a building is stored. In the "door opening/closing frequency for each floor (second floor)" field, an opening/closing frequency of the door of the car of the elevator (or a landing door)

when the elevator identified by the elevator ID stops at the second floor is stored. Note that Fig. 4 shows an example where the door opening/closing frequencies for the first floor and the second floor are stored as the "door opening/closing frequency for each floor", but the present invention is not limited to this example. The number of the "door opening/closing frequency for each floor" field can be increased or decreased in proportion to the number of floors of the building in which the elevator is installed.

[0042]

In the example shown in Fig. 4, records representing that the travel time of the elevator assigned with the elevator ID "12345678" is "70 hours", the door opening/closing frequency for the first floor is "300", and the door opening/closing frequency for the second floor is "20" are stored in the operation data storage area 22b.

[0043]

[Data structure of determination value storage area]

Next, a description will be given of a data structure of the determination value storage area 22e of the data storage 22 of the control center device 2 of the present embodiment with reference to Fig. 5. Fig. 5 is a diagram showing an example of the data structure of the determination value storage area 22e.

[0044]

As shown in Fig. 5, the determination value storage area 22e includes fields of "determination item", "determination value (time)", "determination period (day)", "fixed phrase", and "recommended content". In the "determination item" field, a determination item based on which a determination is made by the analyzer 23b (see Fig. 1) of the control center device 2 is stored. In the "determination value (time)" field, a determination value to be used when the analyzer 23b makes a determination is stored. In the "determination period (day)" field, a detection period for a frequency of an event represented as the determination value is stored

[0045]

In the "fixed phrase" field, a fixed phrase corresponding to content recommended for display on the in-car display device 13 (see Fig. 1) of the elevator when content of the determination item deviates from the determination value (or a plurality of determination values) is stored. In the "recommended content" field, a sentence representing a reason for recommendation of a change to the fixed phrase is stored. The reason for recommendation of a change to the fixed phrase contains, for example, an expected improvement effect of changing the display content on the in-car display device 13 to the

fixed phrase.

[0046]

Note that, Fig. 5 shows an example where "recommended content" is stored in the determination value storage area 22e together with "fixed phrase", but the present invention is not limited to this example. For example, a storage area where only "recommended content" is stored may be provided separately from the determination value storage area 22e.

[0047]

In the example shown in Fig. 5, the determination value (time) of the determination item "high frequency of door opening/closing abnormality" is "2", and the determination period (day) is "30". In this example, a fixed phrase is "Do not pinch anything in a gap of the door, otherwise this may cause a failure." is stored. The recommended content as the reason for recommendation of the fixed phrase is stored as "Prevent the elevator from being stopped due to mischief.". Further, the determination value (time) of the determination item "high frequency of elevator congestion" is "3", and the determination period (day) is "7". In this example, a fixed phrase "Please use stairs/an escalator to move within three floors." is stored. Then, as the recommended content, "Encourage users to move to adjacent floors using another means to reduce

congestion and improve the satisfaction of users moving to higher floors" is stored.

[0048]

Furthermore, the determination value (time) of the determination item "high frequency of safety device trip" is "2", and the determination period (day) is "30". In this example, a fixed phrase "Do not shake the elevator during operation, otherwise this may cause a failure" is stored. As the recommendation content, "Promote an improvement in riding manners and prevent the elevator from being stopped" is stored.

These fixed phrases and recommended content are all stored in the determination value storage area 22e, but are merely examples, and the fixed phrases and recommended content stored in the determination value storage area 22e are not limited to the examples shown in Fig. 5.

[0049]

[Data structure of display content data storage area]

Next, a description will be given of a data structure of the display content data storage area 22f stored in the data storage 22 of the control center device 2 of the present embodiment with reference to Fig. 6. Fig. 6 is a diagram showing an example of the data structure of the display content data storage area 22f.

[0050]

As shown in Fig. 6, the display content data storage area 22f includes fields of "elevator ID", "display schedule (start)", "display schedule (end)", and "fixed phrase". In the "elevator ID" field, the elevator ID is stored. In the "display schedule (start)" field, a scheduled date and time at which the display of a message on the in-car display device 13 starts is stored in the format of YYYY/MM/DD hh:mm:ss. In the "display schedule (end)" field, a scheduled date and time at which the display of a message on the in-car display device 13 ends is stored in the format of YYYY/MM/DD hh:mm:ss. In the "fixed phrase" field, a fixed phrase recommended to be displayed on the in-car display device 13 is stored.

[0051]

In the example shown in Fig. 6, records representing that the start date and time of the display of the message "Do not pinch anything in a gap of the door, otherwise this may cause a failure." in the elevator assigned with the elevator ID "12345678" is 10:00 on April 15, 2019, and the end date and time is 10:00 on May 15, 2019 are stored in the display content data storage area 22f.

[0052]

[Display example of message sent through push notification]

Next, a description will be given of a display example of the receipt notification message on the screen

of the input and output part 33 of the terminal device 3 when the terminal device 3 receives the message sent through the push notification from the control center device 2 with reference to Fig. 7 and Fig. 8. Fig. 7 shows a display example of a recommended display content receipt notification message N1, and Fig. 8 shows a display example of an improvement result report receipt notification message N2 based on a change in display content.

[0053]

At the top of the recommended display content receipt notification message N1 shown in Fig. 7, "sender (XXX service)" is shown. In this section, the name of a maintenance company that is the sender of the message is shown. At the bottom of this section, a message "You have received recommended display content for in-car display device based on operation data" is displayed. In the section where this message is shown, an outline of the message sent through the push notification from the control center device 2 is shown. At the bottom of this section, characters "target building name: ABC building" and "target elevator: No. 2" are displayed. In this section, the name of the target building to which the message representing recommended display content is sent and the number of the target elevator are shown.

[0054]

The user that operates the terminal device 3 can check the recommended display content receipt notification message N1 to confirm that the recommended display content for the in-car display device in No. 2 elevator of the ABC building has been sent from the control center device 2.

[0055]

At the top of the improvement result report receipt notification message N2 shown in Fig. 8, "sender (XXX service)" is shown. In this section, the name of a maintenance company that is the sender of the message is also shown. At the bottom of this section, a message "You have two reports on improvement status of operation data" is displayed. In the section where this message is shown, an outline of the message sent through the push notification from the control center device 2 is shown. At the bottom of this section, characters "target building name: XYZ building" and "target elevator: No. 1 and No. 2" are displayed. In this section, the name of the target building to which the message representing recommended display content is sent and the number of the target elevator are shown.

[0056]

The user that operates the terminal device 3 can check the improvement result report receipt notification message N2 to confirm that the display content for the in-

car display devices in No. 1 and No. 2 elevators of the XYZ building has been changed and that a report on improvement status of the operation data has been sent from the control center device 2.

[0057]

Note that the content of the recommended display content receipt notification message N1 shown in Fig. 7 and the content of the improvement result report receipt notification message N2 shown in Fig. 8 are merely examples, and the present invention is not limited to these examples.

[0058]

When the user clicks on or touch a display area of the recommended display content receipt notification message N1 shown in Fig. 7, an in-car display device display content change screen Sc1 (see Fig. 9) representing recommended display content is displayed on the screen of the input and output part 33 of the terminal device 3.

Further, when the user clicks on or touch a display area of the improvement result report receipt notification message N2 shown in Fig. 8, an improvement result report display screen Sc3 (see Fig. 11) representing an improvement result report is displayed on the screen of the input and output part 33 of the terminal device 3.

[0059]

[Example of in-car display device display content change screen]

Next, a description will be given of an example of the in-car display device display content change screen Sc1 displayed on the screen of the input and output part 33 of the terminal device 3 based on the push notification sent from the control center device 2 with reference to Fig. 9. Fig. 9 is a diagram showing an example of the in-car display device display content change screen Sc1.

[0060]

As shown in Fig. 9, the in-car display device display content change screen Sc1 includes an analysis result display section 101, a display content display section 102, a recommended content display section 103, a radio button display section 104, and a next button 105.

[0061]

The analysis result display section 101 displays analysis results of the operation data and the failure data on the elevator 1 made by the analyzer 23b (see Fig. 1) of the control center device 2. In the example shown in Fig. 9, the analysis result display section 101 displays sections of "building name", "detected content", "detection period", "detection frequency", and "screen image". In the section of "building name", the name of a building in which the elevator 1 is installed is shown, and in the section of

"detected content", an event (incident) detected by the analyzer 23b of the control center device 2 is shown. In the section of "detection period", a start date and time at which the detection of the event is started and an end date and time at which the detection of the event is ended are shown, and in the section of "detection frequency", the detection frequency of an event is shown. In the section of "screen image", display content before change, that is, display content currently displayed on the in-car display device 13 is shown.

[0062]

In the example shown in Fig. 9, a fact that the frequency of congestion of the elevator (congestion state) detected between 0:00 on October 1, 2018 and 23:59 on October 31, 2018 in the ABC building is 15 times is displayed on the analysis result display section 101.

[0063]

Below the analysis result display section 101, a message for the user who is a caretaker of the elevator is displayed. In the example shown in Fig. 9, a message "The above situation may be resolved by changing the display content on the in-car display device. If desired to change the display content, select desired display content" is displayed. Furthermore, a message "If desired to confirm recommended content for changing the display content,

select the following radio button of "recommended content"" is displayed.

[0064]

Below these messages, the display content display section 102, the recommended content display section 103, and the radio button display section 104 are displayed. The display content display section 102 displays content of a notification message of recommended display content sent from the control center device 2 through the push notification. The recommended content display section 103 displays a reason (recommended content) for recommendation of a change in display content. In the radio button display section 104, radio buttons providing three choices of "recommended content", "edit a message (free description)", and "no change (as is)" are displayed.

[0065]

In the example shown in Fig. 9, in the display content display section 102, a message "The elevator will be very crowded around this time of the day, so please use stairs/an escalator to move within three floors." and a time range of "7:30 - 9:00" are displayed. In other words, a message encouraging to move within three floors using a means other than the elevator from 7:30 to 9:00 in the morning is displayed.

[0066]

Further, in the example shown in Fig. 9, since "recommended content" is checked (selected) in the radio button display section 104, a reason for recommendation of a change to the content shown in the display content display section 102 is displayed in the recommended content display section 103 disposed adjacent to a right side of the display content display section 102. Specifically, the recommended content display section 103 displays a message "Encourage to use stairs/an escalator to reduce congestion of the elevator.".

[0067]

The user can select the button of "edit a message (free description)" in the radio button display section 104 to edit the content of the message displayed on the display content display section 102. Further, the user can select the button of "no change (as is)" in the radio button display section 104 to send, to the control center device 2, a reply representing that the display content currently displayed is maintained without being changed to the recommended display content. When the next button 105 is pressed by the user, a screen transition is made to an in-car display device display content determination screen.

[0068]

[Example of in-car display device display content determination screen]

Next, a description will be given of an example of an in-car display device display content determination screen Sc2 with reference to Fig. 10. Fig. 10 is a diagram showing an example of the in-car display device display content determination screen Sc2.

[0069]

As shown in Fig. 10, the in-car display device display content determination screen Sc2 includes the analysis result display section 101, a desired display period display section 106, a display target floor choice display section 107, and a determination button 108.

[0070]

Since the display content in the analysis result display section 101 is the same as the content shown in Fig. 9, no description will be given below of the content. In the desired display period display section 106, three types of methods of specifying a period during which a message is displayed on the in-car display device 13: "display time", "specify display period", and "display cycle" are displayed. In the "display time", a message display period can be specified in the format of "hh:mm". In the "specify display period", the message display period can be specified in the format of "YYYY/MM/DD". In the "display cycle", the message display period can be specified on a day-of-the-week basis.

[0071]

In the display target floor choice display section 107, floor choices for which a message is displayed are displayed. In the example shown in Fig. 10, "1" to "6", that is, the first floor to the sixth floor are displayed as choices. Then, when the determination button 108 is pressed by the user, the content confirmed or changed is determined on the in-car display device display content determination screen Sc2.

[0072]

[Display example of improvement result report]

Next, a description will be given of an example of the improvement result report on operation data display screen displayed on the screen of the input and output part 33 of the terminal device 3 based on the push notification sent from the control center device 2 with reference to Fig. 11. Fig. 11 is a diagram showing an example of an improvement result report display screen Sc3. The improvement result report on operation data display screen Sc3 shown in Fig. 11 is displayed, for example, after the improvement result report receipt notification message N2 shown in Fig. 8 is displayed.

[0073]

As shown in Fig. 11, on the improvement result report on operation data display screen Sc3, a subject

"Improvement result report on operation data" and two improvement result reports assigned with (1) and (2) are shown. Specifically, "(1) The frequency of congestion in No. 1 elevator of the XYZ building from 7:30 to 9:00 has been reduced by 15% compared to before a change in display content." and "(2) The frequency of congestion in No. 2 elevator of the XYZ building from 7:30 to 9:00 has been reduced by 10% compared to before a change in display content."

[0074]

[Display content management method carried out by display content management system]

Next, a description will be given of a display content management method carried out by the display content management system 100 according to the present embodiment with reference to Fig. 12. Fig. 12 is a flowchart showing an example of a flow of the display content management method carried out by the display content management system 100.

[0075]

First, the controller 12 of the elevator 1 (see Fig. 1) collects data from various devices in the elevator 1 (step SE1). In step SE1, the controller 12 of the elevator 1 collects operation data from various devices at a date and time of periodical extraction of the operation data, or

collects, upon, for example, receipt of, from various devices, signals serving as detection notification of a failure of the elevator 1, failure data represented by the signals. Next, the communication part 11 of the elevator 1 sends the data collected by the controller 12 to the control center device 2 (step SE2).

[0076]

Next, the communication part 21 of the control center device 2 receives the collected data sent from the elevator 1, and the controller 23 stores the collected data in the data storage 22 (step SC1). Specifically, the controller 23 stores the failure data contained in the collected data in the failure data storage area 22a and stores the operation data contained in the collected data in the operation data storage area 22b.

[0077]

Next, the calculator 23b2 (see Fig. 1) of the analyzer 23b of the control center device 2 compares a value of the collected data received in step SC1 with the determination value stored in the determination value storage area 22e (step SC2). For example, when the collected data received in step SC1 contains data on the frequency of door opening/closing abnormality, the calculator 23b2 compares the frequency of door opening/closing abnormality with the determination value in

the determination value storage area 22e.

[0078]

Next, the analyzer 23b of the control center device 2 determines whether the elevator 1 that is a sender of the collected data received in step SC1 is a push notification target elevator 1 based on the comparison result in step SC2 and the scheduled work to be conducted by a worker stored in the scheduled work data storage area 22c (see Fig. 1) (step SC3). For example, when the frequency of door opening/closing abnormality contained in the collected data received in step SC1 is greater than the determination value, the analyzer 23b determines that the elevator 1 that is the sender of the collected data is the push notification target elevator 1.

[0079]

When it is determined in step SC3 that the elevator is not the push notification target elevator (NO in step SC3), the processing is terminated. On the other hand, when it is determined in step SC3 that the elevator is the push notification target elevator (YES in step SC3), the notification target extractor 23b1 of the analyzer 23b extracts a target customer to which the push notification is sent and creates the push notification to be sent to the target customer (step SC4).

[0080]

Specifically, the notification target extractor 23b1 extracts the customer to which the push notification is sent by searching the customer data table 22d using, as a key, the elevator ID of the elevator 1 to which the push notification is sent. Furthermore, the notification target extractor 23b1 creates the push notification from the fixed phrase and the recommended content stored in the determination value storage area 22e, with the push notification associated with the determination value used for the determination in step SC3.

[0081]

Next, the push notification controller 23a of the control center device 2 sends the push notification created in step SC4 to the terminal device 3 via the communication part 21 (step SC5).

[0082]

Next, the communication part 31 of the terminal device 3 (see Fig. 1) receives the push notification sent from the control center device 2 (step SM1). Next, the controller 32 of the terminal device 3 displays the notification content on the display part of the input and output part 33 based on the push notification received in step SM1 (step SM2). Specifically, the controller 32 displays the receipt notification message N1 (see Fig. 7) corresponding to the recommended display content

notification message based on the push notification received in step SM1 and then displays the in-car display device display content change screen Sc1 (see Fig. 9). The user who is a caretaker of the elevator 1 can check the display content display section 102 of the in-car display device display content change screen Sc1 to conform display content to which a change is recommended and check the recommended content display section 103 to confirm a reason for recommendation of the display content (recommended content).

[0083]

Next, the controller 32 of the terminal device 3 determines whether an edit operation has been received from the user (step SM3). For example, when the user performs an operation of editing a text displayed on the display content display section 102 of the in-car display device display content change screen Sc1 shown in Fig. 9, the determination in step SM3 result in YES. When it is determined in step SM3 that the edit operation has been received (YES in step SM3), the controller 32 of the terminal device 3 reflects content edited based on the edit operation to the display content on the in-car display device (step SM4).

[0084]

Next, the controller 32 of the terminal device 3

determines the change in display content, and the communication part 31 notifies the control center device 2 that the change content has been determined (step SM5). Even when it is determined in step SM3 that no edit operation has been received from the user (NO in step SM3), step SM5 is executed.

[0085]

Note that, in the present embodiment, the example where the terminal device 3 executes all steps from step SM1 to step SM5 has been given, but the present invention is not limited to this example. For example, the in-car display device display content change screen Sc1, the in-car display device display content determination screen Sc2, and the like may be made open to public on the Web as, for example, a dashboard, and a device responsible for managing the dashboard (such as a server established on a cloud or the like) may perform processing such as displaying the in-car display device display content change screen Sc1 or the like and reflecting the edited content to the display content.

[0086]

Next, the communication part 21 of the control center device 2 receives a determination notification of the change in display content sent from the terminal device 3 in step SM5 and stores the change content thus determined

in the display content data storage area 22f. (step SC6). Next, the command controller 23c of the control center device 2 creates the display content change command for the in-car display device 13 and sends the display content change command to the elevator 1 via the communication part 21 (step SC7). The creation and sending of the display content change command in step SC7 are performed under control of the command controller 23c at the date and time of the display schedule (start) stored in the display content data storage area 22f.

[0087]

Next, the communication part 11 of the elevator 1 receives the display content change command for the in-car display device 13 sent from the control center device 2 in step SC7 (step SE3). Next, the controller 12 of the elevator 1 changes the display content on the in-car display device 13 based on the display content change command received in step SE3 (step SE4). Note that the display content to be changed here corresponds to the change content determined by the controller 32 of the terminal device 3 in step SM5. Next, the communication part 11 of the elevator 1 sends a notification representing that the display content on the in-car display device 13 has been changed (hereinafter, referred to as a "display content completion notification") to the control center

device 2 (step SE5).

[0088]

Next, the communication part 21 of the control center device 2 receives the display content completion notification sent from the elevator 1 in step SE5 (step SC8). Next, the communication part 21 of the control center device 2 sends the display content completion notification to the terminal device 3 (step SC9).

[0089]

Next, the communication part 31 of the terminal device 3 receives the display content completion notification sent from the control center device 2 in step SC9 and displays the notification content on the display part of the input and output part 33 (step SM6). Execution of step SM6 allows the user to understand (confirm) that the display content edited and/or confirmed via the in-car display device display content change screen Sc1 is reflected to the display content on the in-car display device 13.

[0090]

Subsequent to step SE5, the controller 12 of the elevator 1 collects data from various devices in the elevator 1 (step SE6). The collection of data by the controller 12 of the elevator 1 in step SE6 is performed in the same manner as in step SE1. Next, the communication

part 11 of the elevator 1 sends the data collected by the controller 12 to the control center device 2 (step SE7).

[0091]

Next, the communication part 21 of the control center device 2 receives the collected data sent from the elevator 1, and the controller 23 stores the collected data in the data storage 22 (step SC10). Next, the analyzer 23b of the control center device 2 analyzes the improvement result on the operation data (step SC11). In step SC11, the analyzer 23b analyzes the improvement result by comparing the analysis result of various data in the data storage 22 before the change in display content on the in-car display device 13 with the analysis result of various data in the data storage 22 after the change.

[0092]

Next, the controller 23 of the control center device 2 creates the improvement result report on the operation data based on the analysis performed in step SC11. Then, the communication part 21 of the control center device 2 sends the improvement result report to the terminal device 3 (step SC12). Then, the communication part 31 of the terminal device 3 receives the improvement result report on the operation data sent from the control center device 2 in step SC12 and displays the improvement result report on the screen of the input and output part 33 (step SM7).

[0093]

Execution of step SM7 allows the user to know the content of the operation data when the change in display content on the in-car display device 13 improves the content of the operation data.

[0094]

As described above, in the display content management system 100 of the elevator 1 of the present embodiment, the analyzer 23b of the control center device 2 serving as the display content management device analyzes the collected data on the elevator 1 containing the operation data on the elevator 1. Then, recommended display content for display on the in-car display device 13 is determined based on a result of the analysis. Then, the communication part 31 sends the recommended display content to the terminal device 3 operated by the user who is a caretaker of the elevator 1.

[0095]

Therefore, the present embodiment prevents the user who is a caretaker of the elevator 1 from forgetting to examine the content to be displayed on the in-car display device 13 or to change the content. Therefore, according to the present embodiment, it is possible to reduce a burden on the elevator caretaker through examination of content to be displayed on the in-car display device and

change timing of the content. In particular, an elevator caretaker such as a building maintenance company who takes care of a large number of elevators tends not to satisfactorily manage changes in content to be displayed on the in-car display device, but, according to the present embodiment, such a burden on the user can be reduced.

[0096]

Further, in the present embodiment, since a burden on the elevator caretaker can be reduced, the content to be displayed on the in-car display device 13 is suitably changed. Therefore, according to the present embodiment, the in-car display device 13 of the elevator 1 is effectively used; therefore, the satisfaction of the caretaker of the elevator 1 can be increased.

[0097]

Further, in the above-described embodiment, the control center device 2 includes the push notification controller 23a that sends the push notification containing recommended display content to the terminal device 3. Therefore, according to the present embodiment, since the recommended display content is automatically displayed on the terminal device 3 based on the push notification, it is possible to prevent the user from forgetting to change the content.

[0098]

Further, in the above-described embodiment, the content to be sent from the communication part 21 to the terminal device 3 through the push notification contains the recommended display content and the reason for recommendation of the recommended display content containing a description of an expected improvement effect of changing the display content on the in-car display device 13 to the recommended display content. Therefore, according to the present embodiment, the user confirms the expected improvement effect of changing the display content on the in-car display device 13 to the recommended display content, and thereby can determine whether the display content on the in-car display device 13 is changed to the recommended display content or determine whether the change is suitable.

[0099]

Further, in the above-described embodiment, the analyzer 23b compares the analysis of the collected data before and after a change in display content on the in-car display device 13 based on the recommended display content. Then, based on a result of the comparison, the improvement result report representing the improvement result on the operation data of the elevator 1 is created. The communication part 21 sends the improvement result report to the terminal device. Therefore, according to the

present embodiment, the user can confirm that the operation data of the elevator 1 has actually been improved by the change of the display content on the in-car display device 13 to the recommended display content.

[0100]

Further, in the above-described embodiment, the command controller 23c of the control center device 2 creates a command (display content change command for the in-car display device 13) when the change in display content to be displayed on the in-car display device 13 is determined based on an editing and confirmation operation or a confirmation operation, made by the user who has checked the recommended display content, on the display content to be displayed on the in-car display device 13. This command is used to change the display content on the in-car display device 13 to the content thus determined. Then, the command controller 23c sends the command to the elevator 1 via the communication part 21. Therefore, according to the present embodiment, it is possible to change the display content on the in-car display device 13 based on the editing and confirmation operation or the confirmation operation, made by the user, on the display content.

[0101]

[Various modifications and application examples]

The display content management device and the display content management system according to various embodiments of the present invention have been described above, but the present invention is not limited to the above various embodiments. The configuration of the present invention may include various other modifications and application examples without departing from the gist of the present invention recited in the claims. For example, the following various modifications and application examples also fall within the scope of the present invention.

[0102]

For example, in the above-described embodiment, the example where the control center device 2 sends, to the terminal device 3, the notification message of recommended display content for the in-car display device 13 and the report message of an improvement result based on a change in display content has been given, but the present invention is not limited to this example. Information on the date and time of scheduled regular inspection to be carried out or the like may be sent from the control center device 2 to the terminal device 3.

[0103]

Further, only control lines and data lines considered necessary for the description are shown in Fig.

1, and all the control lines and data lines necessary for the product are not necessarily shown. In practice, it may be considered that almost all the components are mutually connected.

CLAIMS

1. A display content management device that manages display content for the users of an elevator, to be displayed on an in-car display device of the elevator, comprising:

an analyzer that analyzes collected data on the elevator containing operation data on the elevator to determine recommended display content for the users of an elevator, that is recommended for display on the in-car display device based on a result of the analysis;

a communication part that sends the recommended display content for the users of an elevator, to a terminal device operated by a user who serves as a caretaker of the elevator;

a push notification controller that sends a push notification containing the recommended display content to the terminal device via the communication part, wherein content sent from the communication part to the terminal device through the push notification contains the recommended display content, and a reason for recommendation of the recommended display content containing a description of an expected improvement effect of changing the display content on the in-car display device to the recommended display content; and

a command controller that sends, upon determination to change the display content to be displayed on the in-car display device based on an editing and confirmation operation or a confirmation operation, made by the user who has checked the recommended display content, on the display content to be displayed on the in-car display device, a command to change the display content on the in-car display device to the content determined to the elevator via the communication part.

2. The display content management device according to claim 1, wherein

the analyzer compares analyses of the collected data before and after the display content on the in-car display device is changed based on the recommended display content, and creates an improvement result report representing an improvement result on the operation data based on a result of the comparison, and

the communication part sends the improvement result report to the terminal device.