

TITLE OF THE INVENTION

BUILDING FACILITY MANAGEMENT SYSTEM AND BUILDING FACILITY
MANAGEMENT METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0001]

The present invention relates to a building facility management system and a building facility management method.

2. Description of the Related Art

[0002]

In general, there is a technique for providing information on the basis of a monitoring result of a building facility such as an elevator. For example, JP 2011-195284 A discloses that "Operation data of each apparatus during normal operation, which is output from an operation control unit 21, is recorded in a recording unit 22. An abnormality detection unit 23 determines a possibility of abnormality on the basis of the operation data of each apparatus recorded in the recording unit 22, selects, from a menu list 24, at least two or more diagnosis operation menus for verifying a cause of the abnormality, and causes the operation control unit 21 to implement diagnosis operation corresponding to the

diagnosis operation menus. The operation control unit 21 changes priority stored in a priority table 25 on the basis of a current situation of an elevator 11 and implements the diagnosis operation corresponding to each diagnosis operation menu in accordance with the changed priority".

SUMMARY OF THE INVENTION

[0004]

However, the technique disclosed in JP 2011-195284 A is for determining the priority of the diagnosis operation within the scope of a contract that has already been concluded and does not present a recommended service from a service menu outside the scope of the contract. A building facility has complicated and various different functions, and the functions include not only basic functions that a customer who purchases the building facility easily desires to actively use, but also, for example, responses to abnormalities such as malfunctions and disasters and functions that are effective in specific use cases and are less frequently used. The building facility has a long life, and thus functions are added after installation in some cases. From the above, it is difficult for the customer to comprehensively grasp the functions of the building facility and select a function necessary for the customer. Thus, there is a possibility that there is

another function useful for the customer in addition to an already contracted function, and how to present such a function is an important problem.

An object of the present invention is to efficiently provide information regarding a function of the building facility.

[0005]

In order to solve the above problem and achieve the object of the present invention, a building facility management system of the present invention is a building facility management system including a monitoring unit configured to monitor a building facility, the building facility management system including: a recording unit configured to record building facility information including information regarding a type of the building facility, a monitoring result by the monitoring unit, service menu information including information regarding a maintenance service, and contract information of the maintenance service; a recommended function selection unit configured to select a recommended function from the service menu information outside a scope of the contract by using the building facility information, the monitoring result, the service menu information, and the contract information; and an output unit configured to output the recommended function selected by the recommended function

selection unit.

Further, a building facility management method of the present invention is a building facility management method in which a building facility is monitored, the method including: a recording step of recording building facility information including information regarding a type of the building facility, a monitoring result, service menu information including information regarding a maintenance service, and contract information of the maintenance service; a recommended function selection step of selecting a recommended function from the service menu information outside a scope of the contract by using the building facility information, the monitoring result, the service menu information, and the contract information; and an output step of outputting the recommended function selected in the recommended function selection step.

[0006]

The present invention can efficiently provide information regarding a function of the building facility.

Problems, configurations, and effects other than those described above will be clarified by the following description of embodiments.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007]

Fig. 1 is a block diagram of an elevator function trial control system according to the present embodiment;

Fig. 2 shows an example of registration of customer information in a customer information DB according to the present embodiment;

Fig. 3 shows an example of a recommended function output processing flow according to the present embodiment;

Fig. 4 shows a first display example of a trial application/demonstration experience execution screen according to the present embodiment;

Fig. 5 shows a second display example of the trial application/demonstration experience execution screen according to the present embodiment;

Fig. 6 shows an example of recommended function selection processing of an in-building information visualization apparatus according to the present embodiment;

Fig. 7 shows an example of function enabling processing of the in-building information visualization apparatus according to the present embodiment;

Fig. 8 shows an example of an initial display flow of the trial application/demonstration experience execution screen according to the present embodiment; and

Fig. 9 shows an example of a trial application/demonstration experience execution processing

flow according to the present embodiment.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0008]

Hereinafter, embodiments of the present invention will be described with reference to the drawings. Hereinafter, in the present specification, components having the same function will be denoted by the same reference signs unless otherwise specified, and repeated description will be omitted. A building facility includes an elevator, an air conditioning apparatus, a lighting apparatus, a security gate, and the like. In the embodiments, an elevator will be mainly exemplified, and an elevator function trial control system will be described as an example of a building facility management system. Note that description of a main rope, a counterweight, a car, a hoist, a security camera, a video recording device, and the like included in the elevator will be omitted.

First embodiment

[0009]

Fig. 1 is a block diagram showing an entire configuration of an elevator function trial control system 100 according to an embodiment of the present invention.

An in-building information visualization apparatus 1 of Fig. 1 is connected to an elevator monitoring/control

apparatus 21 installed in a building 2 through a communication network 4 and is also connected to a customer operation terminal 3 through a communication network 5. The in-building information visualization apparatus 1 may further be connected to an operation terminal 9 of a maintenance person or a sales representative as necessary.

[0010]

The elevator monitoring/control apparatus 21 corresponds to a monitoring unit recited in the claims, is provided in an elevator 22, and constantly monitors and stores an operation state of the elevator 22, such as presence/absence of malfunctions, an operation time, and the number of operations of a door sensor, a seismic sensor, or the like. The elevator monitoring/control apparatus 21 is provided in each of a plurality of elevators.

[0011]

The number of buildings in which such a plurality of building facilities is installed is not limited to one and may be plural. In the present embodiment, one building facility is treated as a management unit, but the management unit is not limited thereto. For example, a building group including a plurality of buildings may be treated as the management unit. Further, another structure such as a factory or a station may be treated as the

management unit as a kind of building.

[0012]

Each of the communication networks 4 and 5 may be, for example, the Internet, a mobile communication network, a wired LAN, a wireless LAN, a dedicated line, or a combination thereof. The communication networks 4 and 5 may be one communication network (e.g. the Internet). The customer operation terminal 3 is an information processing terminal that a customer possesses or uses and includes a display device, an input device, and an interface device. The input device may be not only a keyboard and a mouse but also a touchscreen integrated with the display device. A specific example of such a customer operation terminal 3 is not particularly limited, but corresponds to, for example, a personal computer, a tablet, and a smartphone. The number of customer operation terminals 3 is not limited to one and may be plural.

The customer in the present embodiment refers to a person or organization (contractor) who concludes a maintenance and management contract (hereinafter, service-level agreement) for the building 2 and receives a maintenance service.

[0013]

The in-building information visualization apparatus 1 may be an apparatus including an interface device (not

shown), a storage device 12, and a processor connected to those devices or may be an apparatus implemented on the apparatus (e.g. a cloud infrastructure). The interface device allows the in-building information visualization apparatus 1 to receive input of data and output data. Specifically, the in-building information visualization apparatus 1 may include a keyboard and a display, or the operation terminal 9 used by the maintenance person or sales representative may be used as the interface device of the in-building information visualization apparatus 1.

[0014]

The in-building information visualization apparatus 1 includes a customer information input unit 11, the storage device 12, a collection/setting processing unit 13, a visualization processing unit 14, an available function generation unit 15a, a recommended function selection unit 15b, a trial permission unit 16, and a communication unit 17.

[0015]

The storage device 12 corresponds to a recording unit recited in the claims and stores a customer information DB 12a, a model function management DB 12b, an SLA function management DB 12c, an initial setting information DB 12d, an operation state DB 12e, a trial use application DB 12f, and a demonstration experience control

DB 12g.

The model function management DB 12b, the SLA function management DB 12c, and the demonstration experience control DB 12g are registered in advance by a system administrator.

[0016]

The customer information DB 12a holds information regarding the customer. The model function management DB 12b holds information regarding a maintenance service menu (information regarding a providable function) for each elevator model. The SLA function management DB 12c holds information regarding a function that can be used on a trial basis (a function that can be selected as a recommended function) for each service-level agreement SLA. The function that can be used on a trial basis is selected by the system administrator from elevator functions. The initial setting information DB 12d holds information regarding a setting state of each elevator function, that is, enabling and disabling of each elevator function in the elevator monitoring/control apparatus. The operation state DB 12e holds operation state information that is information regarding the operation state of the elevator. The trial use application DB 12f holds information regarding a data reference application status and data integration.

[0017]

In the in-building information visualization apparatus 1, the processor is, for example, a central processing unit (CPU). The storage device 12 includes a memory. The memory is, for example, a read only memory (ROM) and a random access memory (RAM). When the CPU reads and executes a program code stored in the ROM, software and hardware cooperate to implement functions such as the customer information input unit 11, the collection/setting processing unit 13, the visualization processing unit 14, the available function generation unit 15a, the recommended function selection unit 15b, and the trial permission unit 16. The storage device 12 includes not only the ROM and the RAM but also a permanent storage device such as a hard disk drive (HDD).

[0018]

The customer information input unit 11 is a processing unit that inputs the information regarding the customer to the customer information DB 12a. The information regarding the customer can include a person who receives a maintenance service, a contractor, contract information indicating content of a contract, and the like.

[0019]

The collection/setting processing unit 13 is connected to the elevator monitoring/control apparatus 21

through the communication network 4 for each elevator indicated by the customer information DB 12a every, for example, 30 minutes. The collection/setting processing unit 13 periodically collects operation information indicating the operation state of the elevator and registers the collected information in the operation state DB 12e. The operation state information of the elevator includes, as monitoring results, information based on which whether the elevator is in operation or is stopped can be determined and information regarding an operation record of the elevator such as the operation time and the number of operations of the door sensor, the seismic sensor, or the like.

[0020]

The visualization processing unit 14 processes data to be output to an operator and generates screen data to be output to the operator. For example, the visualization processing unit 14 can generate a screen that requests input of a user name and a password and a screen that displays a recommended function.

[0021]

The available function generation unit 15a is a processing unit that calculates services providable for the current building facility. The services providable for the current building facility are specified with reference to

the customer information DB 12a, the model function management DB 12b, the SLA function management DB 12c, and the initial setting information DB 12d.

[0022]

The recommended function selection unit 15b is a processing unit that selects a service to be recommended to the customer from among the services specified as being providable by the available function generation unit 15a. Specifically, a service that is specified as being providable, is outside the scope of the current contract, and is determined to be highly effective on the basis of the operation state indicated by the operation state DB 12e is selected.

[0023]

The trial permission unit 16 is a processing unit that temporarily enables a function of the service selected by the recommended function selection unit 15b to be executed, thereby permitting the customer to use the service on a trial basis. This trial will be described in detail in a second embodiment.

[0024]

The communication unit 17 functions as an output unit that outputs the recommended function selected by the recommended function selection unit 15b. An output destination is arbitrary and can be the customer operation

terminal 3, the operation terminal 9 of the maintenance person or sales representative, the elevator monitoring/control apparatus 21, or the like.

[0025]

Hereinafter, various kinds of information will be described. The customer information input unit 11 registers customer information regarding a customer who has concluded a service-level agreement in the customer information DB 12a in response to an input from the sales representative who performs sales activities.

As shown in Fig. 2, the customer information DB 12a has a customer record indicating one piece of customer information for each building facility ID for which the service-level agreement has been concluded. The customer record includes a customer, a customer ID, a building ID, a building address, a service-level agreement SLA, a state of the service-level agreement, an elevator ID, and an elevator model.

[0026]

The storage device 12 may store a user DB (not shown). The "user" herein is a person (e.g. an employee) belonging to the customer in the present embodiment. The user DB may have a user record for each user. The user record desirably includes a user ID, a password, and the customer ID. The user ID and the password are

authentication information for identifying a user who can access the in-building information visualization apparatus 1.

[0027]

Herein, how to use the user ID and the password will be described. The customer operation terminal 3 is connected to the in-building information visualization apparatus 1 through the communication network 5 in response to a user operation. In response to this connection, the visualization processing unit 14 requests the user ID and the password from the user. That is, the visualization processing unit 14 outputs information prompting input of the user ID and the password to the customer operation terminal 3.

[0028]

Then, when accepting the user ID and the password registered in the user DB, the visualization processing unit 14 can display, on the customer operation terminal 3, the operation state information acquired from the customer information DB 12a and the operation state DB 12e and elevator function list information acquired from the customer information DB 12a and the model function management DB 12b.

[0029]

In the present embodiment, reference of the

operation state information of the elevator will be described, but, in place of or in addition to the operation state of the elevator, an inquiry response regarding the elevator, an inspection scheduled date, an inspection result, and the like may be displayed. Not only the operation state of the elevator but also an operation state of an apparatus to be maintained such as an escalator or an air conditioning facility may be displayed. As described above, various kinds of contract information regarding the elevator can be handled in the present embodiment.

[0030]

Fig. 3 shows an example of a recommended function output processing flow according to the present embodiment.

First, the available function generation unit 15a acquires a service menu from the storage device 12 (step ST01) and determines whether or not the service is providable for the building (step ST02). When the service is not providable for the building (step ST02; NO), the processing returns to step ST01, and the next service is selected.

[0031]

When the service is providable for the building (step ST02; YES), the recommended function selection unit 15b acquires contract information from the storage device 12 (step ST03) and determines whether or not the service is

outside the scope of the contract (step ST04). When the service is not outside the scope of the contract (step ST04; NO), the processing returns to ST01, and the next service is selected.

[0032]

When the service is outside the scope of the contract (step ST04; YES), the recommended function selection unit 15b acquires a monitoring result from the operation state DB 12e of the storage device 12 (step ST05) and determines whether or not the monitoring result exceeds a determination value (step S06). When the monitoring result does not exceed the determination value (step ST06; NO), the processing returns to ST01, and the next service is selected.

[0033]

When the monitoring result exceeds the determination value (step ST06; YES), the recommended function selection unit 15b selects the service as a recommended function and outputs the service via the visualization processing unit 14 and the communication unit 17 (step ST07).

[0034]

In Fig. 3, whether the service is providable, the scope of the contract, and the monitoring result are determined in this order, but the order of those determination processes may be different, or the

determination processes may be performed in parallel.

Second embodiment

[0035]

In the first embodiment, the configuration in which a recommended function is selected and output has been described. In the second embodiment, a configuration in which a recommended function is selected and a trial of the function is permitted will be described. First, display of a trial application/demonstration experience execution screen of the elevator will be described with reference to Figs. 4 and 5.

In Figs. 4 and 5, description will be made on the assumption that a user of a customer "oo management association" operates a trial application/demonstration experience execution screen 301.

[0036]

Fig. 4 shows a first display example of the trial application/demonstration experience execution screen according to the present embodiment.

The trial application/demonstration experience execution screen 301 displayed on the customer operation terminal 3 by the visualization processing unit 14 is as shown in Fig. 4. The trial application/demonstration experience execution screen 301 is, for example, a

graphical user interface (GUI) and includes a customer information display field 3011 and an elevator function list display field 3012.

For example, the customer information display field 3011 displays the customer, the building ID, the elevator ID for identifying the elevator, and the like registered in the customer information DB 12a.

[0037]

Herein, the elevator function list display field 3012 has a function record of the elevator for which the service-level agreement has been concluded in the building having the building ID. The function record includes an item number (No.), a function name, and the service-level agreement SLA. Herein, the elevator model information, the service-level agreement SLA, and a trial-function available service which are registered by the system administrator are displayed in the elevator function list display field 3012 shown in FIG. 4.

[0038]

In the present embodiment, three types of basic, standard, and premium service-level agreements (SLAs) are prepared, and the customer has the basic service-level agreement SLA.

[0039]

In order to understand the current service-level

agreement SLA at a glance, it is desirable to write, for example, the word "(under contract)" in a display field of the basic service-level agreement.

Further, in order for the user to easily read the service-level agreements SLA when viewing a display screen of the customer operation terminal 3, it is desirable to display the service-level agreements SLA in descending order of their available functions from left to right.

[0040]

In the present embodiment, the available functions increase in the following order: the basic, standard, and premium service-level agreements, and functions available in a lower service-level agreement SLA are also available in a higher service-level agreement SLA.

By displaying the service-level agreements SLA as described above, it is possible to encourage update to a higher service-level agreement SLA.

[0041]

Next, display of a trial application will be described in detail. On the display screen of the customer operation terminal 3, the service-level agreement SLA that the customer to whom an operating user belongs has is the basic service-level agreement. Thus, whether or not each function is available is displayed in a cell of the corresponding function record of a column of the basic

service-level agreement SLA. In Fig. 4, "o" is displayed in a case where the function is available, and "-" is displayed in a case where the function is unavailable.

[0042]

Columns of the standard and premium service-level agreements are displayed in this order on the right side of the current basic service-level agreement. First, in a case where the available functions of the basic and standard service-level agreements are compared and there is no difference therebetween, for example, in a case where both have the function, "o" is displayed in a cell of the function record of the column of the standard service-level agreement, and, in a case where both do not have the function, "-" is displayed in the cell of the function record of the column of the standard service-level agreement. In a case where there is a difference, that is, in a case of a function that is not available in the basic service-level agreement but is available in the standard service-level agreement, a trial use button 3013 and a demonstration experience button 3014 are displayed in a cell of the function record of the column of the standard service-level agreement.

[0043]

Similarly, in the column of the premium service-level agreement, the trial use button 3013 and the

demonstration experience button 3014 are displayed by comparing available functions with those of the basic service-level agreement.

The demonstration experience button 3014 is desirably in a disabled state before the user presses the trial use button 3013 and is desirably enabled after the user presses the trial use button 3013 and starts a trial use. Although not shown in the present embodiment, a trial use stop button may be provided. Each of those tools (the customer information display field 3011 to the demonstration experience button 3014) can be implemented by, for example, a GUI component.

[0044]

Fig. 5 shows a second display example of the trial application/demonstration experience execution screen according to the present embodiment.

Fig. 5 is a display example where the recommended function selection unit 15b analyzes the operation state of the elevator of the customer and emphasizes and visualizes recommended functions on the basis of an analysis result.

In Fig. 5, the recommended functions are an automatic temporary restoration function at the time of an earthquake and a cooperative operation function with the earthquake early warning. There are several methods of emphasizing the recommended functions, and, for example, a

font format or a background color of cells of the function number and the elevator function name of the function records in the elevator function list display field 3012. It is desirable to display a recommended function legend 3015 so that it can be understood that the recommended functions are proposed.

[0045]

When the recommended functions are displayed, it is preferable to display the recommended functions together with information based on which the recommended functions are selected.

For example, in a case of an earthquake response function that operates when an earthquake occurs, the number of detections of earthquakes in a past predetermined period may be shown.

Similarly, in a case of an entrapment coping function of coping with a trapped car, the number of entrapments may be shown.

Further, in a case where a degeneration operation function for appropriately stopping some of a plurality of elevators is recommended, a transition of the number of passengers may be shown.

[0046]

The recommended functions can include not only the earthquake response function, the entrapment coping

function, and the degeneration operation function, but also arbitrary functions such as a display service of a display in the car, a separation function of excluding a specific floor from getting-on/off floors, and a straight-through function of not stopping at other floors during an operation toward a specific floor. Those functions can be changed, added, and removed, and the latest functions are registered in the model function management DB 12b. Therefore, the recommended functions can be selected from the latest functions.

[0047]

Among the above functions, there are functions suitable for demonstration. For example, the earthquake response function and the entrapment coping function are effective when an abnormality such as a disaster or malfunction occurs, and, even if a predetermined trial period is provided, the abnormality does not necessarily occur within the period. Therefore, those functions are suitably demonstrated on the assumption that the abnormality occurs.

Further, the display service of the display in the car requires time and costs to prepare content to be actually displayed. Therefore, the display service is suitably demonstrated by using content prepared in advance.

Meanwhile, when the predetermined trial period is

provided, effectiveness of the separation function and the straight-through function can be confirmed within the period. Therefore, the necessity of demonstration is low.

[0048]

The analysis of the operation state of the elevator and a method of determining a recommended function in the recommended function selection unit 15b will be described with reference to Fig. 6.

[0049]

Recommended function selection processing of the in-building information visualization apparatus will be described with reference to Fig. 6.

Fig. 6 shows an example of the recommended function selection processing of the in-building information visualization apparatus according to the present embodiment.

[0050]

First, when the customer operates the customer operation terminal 3 and transmits a request to display the trial application/demonstration experience execution screen 301 to the visualization processing unit 14, the visualization processing unit 14 transmits the customer ID, the building ID, and the elevator ID of the customer who operates the customer operation terminal 3 to the recommended function selection unit 15b in response to this

request. The recommended function selection unit 15b refers to the customer information DB 12a by using the received customer ID, building ID, and elevator ID as keys and acquires the elevator model and the service-level agreement SLA. By referring to the model function management DB 12b by using the acquired elevator model as a key, it is possible to acquire a list of function names that the elevator owned by the customer has. In the model function management DB 12b, all functions that the elevator originally has are managed, regardless of the service-level agreement SLA.

[0051]

Then, by referring to the SLA function management DB 12c by using the service-level agreement SLA acquired from the customer information DB 12a and the elevator model, the function number, and the function name acquired from the model function management DB 12b as keys, it is possible to acquire the function number, the function name, and whether or not the function is available, which are managed for each service-level agreement SLA of the elevator.

[0052]

Depending on whether or not the function is available acquired from the SLA function management DB 12c as described above, it is possible to form a display field of the service-level agreement SLA among the function

records in the elevator function list display field 3012. In a case where there is a function whose trial use application has already been made, the trial use application DB 12f and the initial setting information DB 12d are also referred to, but description thereof is omitted.

[0053]

Next, the analysis of the operation state of the elevator and the method of determining a recommended function will be described.

As described above, when information is acquired from the customer information DB 12a, the model function management DB 12b, and the SLA function management DB 12c, the number of operations of the seismic sensor of the elevator is acquired from the operation state DB 12e. The system administrator sets, to the recommended function selection unit 15b, a determination value for determining whether to recommend the automatic temporary restoration function at the time of an earthquake and the cooperative operation function with the earthquake early warning to the customer depending on more than how many times earthquakes have occurred in a certain period from the present, compares the determination value with the number of operations of the seismic sensor, and, in a case where the number of operations of the seismic sensor is equal to or

more than the determination value, adds this determination result and performs visualization processing, thereby emphasizing and visualizing the recommended functions as shown in Fig. 5.

[0054]

In addition, it is conceivable, as the recommendation function, to recommend operation stop in a case where the operation time of the elevator is short or the number of activations is small and to recommend a function of setting extension of a door opening time in a case where the number of operations of the door sensor is large. By setting a determination condition and determination value for each function, it is possible to provide a recommended function of the elevator for the customer.

It is also possible to make a proposal for operation improvement by visualizing of a flow of people. For example, it is possible to recommend "visualization of a flow of people and an elevator usage status" by using "an increase in elevator waiting time and an increase in waiting people" as a monitoring result.

It is also possible to propose an elevator usage time shift and improvement of an operation plan (e.g. a change of the number of elevators stopping at a lobby at the time of congestion) on the basis of the visualized

information. With those proposals, it is possible to implement a congestion mitigation method based on data, improve an experience value of a building user, and improve a value of the building.

[0055]

The recommended function may be selected by further using information regarding a maintenance range of another building. Specifically, a function contracted with a high frequency in buildings of similar sizes and uses can be set as the recommended function.

[0056]

In the present embodiment, the customer ID, the building ID, and the elevator ID are used as keys. However, the recommended function may be acquired from all contracted buildings and elevators as targets, without specifying the building ID or the elevator ID.

[0057]

In a case where there is a plurality of recommended functions, the recommended functions may be prioritized. Specifically, differences between values of monitoring results used to select the recommended functions and determination values may be standardized, and a function having a value that largely deviates from the determination value may be preferentially recommended. The functions may also be preferentially recommended in descending order of

the number of applications and an application rate by using an application status in similar buildings.

[0058]

Next, function enabling processing of the in-building information visualization apparatus will be described with reference to Fig. 7.

Fig. 7 shows an example of the function enabling processing of the in-building information visualization apparatus according to the present embodiment.

When the customer operates the trial application/demonstration experience execution screen 301 in Fig. 4 and presses the trial use button 3013 of the function record, the customer operation terminal 3 transmits a request to register a trial use application to the visualization processing unit 14 together with information regarding the customer ID, the building ID, the elevator ID, the function number, and the function name.

[0059]

In response to this, the visualization processing unit 14 instructs the trial permission unit 16 to register the received information, thereby registering the information in the trial use application DB. Further, the visualization processing unit 14 refers to the initial setting information DB 12d by using the received information as a key and updates a cell of

enabling/disabling of the function of the record corresponding to the function number and the function name for which the trial use application has been made, thereby enabling the function. The collection/setting processing unit 13 extracts update information for the initial setting information DB 12d and sets the update information to the elevator monitoring/control apparatus 21. Therefore, the function whose trial use application has been made is available in the elevator.

[0060]

Note that information already exists in the initial setting information DB 12d in order to enable functions corresponding to the service-level agreement SLA after the service-level agreement is concluded. Further, enabling/disabling of all the functions that the elevator originally has is managed in the initial setting information DB 12d.

The trial use application may be automatically disabled when a certain period of time elapses, or, even if the certain period of time does not elapse, the trial use may be terminated by pressing a trial use stop button (not shown) provided on the trial application/demonstration experience execution screen 301.

[0061]

After the function whose trial use application has

been made becomes available in the elevator, the trial application/demonstration experience execution screen 301 of the customer operation terminal 3 is updated by the recommended function selection unit 15b and the visualization processing unit 14, and a demonstration experience button of the function record of the function is enabled.

[0062]

For example, even in a case where a function of emergency operation control that is cooperatively performed with the earthquake early warning at the time of an earthquake, a function of protecting the elevator from flood damage caused by typhoons or heavy rains, and the like are enabled, those functions cannot be immediately experienced. Therefore, in order to simulate an earthquake, typhoon, or heavy rain to experience the functions, the demonstration experience button is used to transmit a demonstration experience operation control request to the elevator monitoring/control apparatus 21.

[0063]

When the customer presses the demonstration experience button 3014 on the trial application/demonstration experience execution screen 301, the customer operation terminal 3 transmits a request to execute elevator function demonstration experience control

to the visualization processing unit 14 together with the information regarding the customer ID, the elevator ID, the function number, and the function name.

[0064]

In response to this, the visualization processing unit 14 instructs the trial permission unit 16 to execute the received request to execute the elevator function demonstration experience control. The trial permission unit 16 refers to the initial setting information DB 12d, confirms that the function whose execution request has been made is enabled, acquires demonstration control execution command information from the demonstration experience control DB 12g by using the elevator model, the function number, and the function name as keys, transmits the demonstration control execution command information to the collection/setting processing unit 13, and transmits the demonstration control execution command information to the elevator monitoring/control apparatus 21.

[0065]

The elevator monitoring/control apparatus 21 operates the function of the elevator by, for example, switching the elevator to a specific operation mode in accordance with the received demonstration control execution command information.

Because the customer operation terminal 3 may be a

tablet, a smartphone, or the like, it is possible to perform demonstration experience control in an elevator hall or the car and experience the function of the elevator.

An operation in an elevator operation mode or the like executed by the demonstration experience control desirably returns to a normal operation in a predetermined time (e.g. one minute).

[0066]

Next, an initial display flow of the trial application/demonstration experience execution screen 301 will be described with reference to Fig. 8.

Fig. 8 shows an example of the display flow of the trial application/demonstration experience execution screen according to the present embodiment. Description of basic operations such as login to and logout from the system is omitted.

[0067]

First, a service-level agreement is concluded between a sales representative who performs sales activities and a customer. At this time, the customer transfers a login ID and the like for operating the system to the sales representative (S01). The sales representative operates the customer information input unit 11 of the in-building information visualization apparatus

1, inputs customer information, and outputs a request to register the customer information in the customer information DB 12a (S02). The in-building information visualization apparatus 1 registers the input customer information in the customer information DB 12a in response to the registration request (S03).

[0068]

Next, a maintenance person operates the collection/setting processing unit 13 to search whether the customer information of the customer who needs to perform an initial setting of the elevator monitoring/control apparatus 21 is registered in the customer information DB 12a (S04) and responds with a result of the search in the customer information DB 12a (S05). As a result of the search for the customer information, in a case where the customer information is not registered ("NO" in S04), S04 and S05 are repeated until the customer information is registered. In a case where the customer information is registered ("YES" in S04), the processing proceeds to S06.

[0069]

Next, the maintenance person operates the collection/setting processing unit 13 to acquire information from the customer information DB 12a and the model function management DB 12b, creates initial setting information to be set in the elevator monitoring/control

apparatus 21, and registers the initial setting information in the initial setting information DB 12d (S06). When the initial setting information is registered by the maintenance person, the collection/setting processing unit 13 is connected to the elevator monitoring/control apparatus 21 through the communication network 4 and transmits the initial setting information thereto (S07). Based on the received initial setting information, the elevator monitoring/control apparatus 21 sets enabling or disabling of each function of the elevator in the elevator, thereby permitting control of the enabled function (S08). [0070]

After the initial setting of the elevator monitoring/control apparatus 21 is completed, the customer operates the customer operation terminal 3 to output an access request to the in-building information visualization apparatus 1 through the communication network 5 (S09). In response to the access request, the visualization processing unit 14 and the recommended function selection unit 15b of the in-building information visualization apparatus 1 refer to the customer information DB 12a to confirm the customer ID of the customer "○○ management association", the building ID of the elevator having the service-level agreement, and the elevator ID. That is, the in-building information visualization apparatus 1

identifies the building ID corresponding to the customer ID or the user ID included in the access request (S10).

[0071]

Then, as described with reference to Fig. 6, the recommended function selection unit 15b of the in-building information visualization apparatus 1 combines the customer information DB 12a, the model function management DB 12b, the SLA function management DB 12c, and the operation state DB 12e to extract information and adds an analysis result of a recommended function, thereby outputting screen information to be displayed on the trial application/demonstration experience execution screen 301 of the customer operation terminal 3 from the visualization processing unit 14 to the customer operation terminal (S11).

[0072]

Therefore, the customer can confirm the screen information output from the visualization processing unit 14 on the trial application/demonstration experience execution screen 301 of the customer operation terminal 3 and can execute a trial use application and a demonstration experience (S12).

[0073]

Next, a trial application/demonstration experience execution processing flow will be described with reference

to Fig. 9.

Fig. 9 shows an example of the trial application/demonstration experience execution processing flow according to the present embodiment.

First, the customer operates the customer operation terminal 3 to output an access request to the in-building information visualization apparatus 1 through the communication network 5. As described with reference to Fig. 6, in response to the access request, the visualization processing unit 14 and the recommended function selection unit 15b of the in-building information visualization apparatus 1 combine the customer information DB 12a, the model function management DB 12b, the SLA function management DB 12c, and the operation state DB 12e to extract information and adds an analysis result of a recommended function, thereby outputting screen information to be displayed on the trial application/demonstration experience execution screen 301 of the customer operation terminal 3 from the visualization processing unit 14 (K01). Therefore, the customer can confirm the screen information output from the visualization processing unit 14 on the trial application/demonstration experience execution screen 301 of the customer operation terminal 3. When the customer confirms a function that can be used on a trial basis from the elevator function list display field 3012 of

the trial application/demonstration experience execution screen 301 (K02) and presses the trial use button 3013 displayed in a function record of a function that the customer desires to use on a trial basis, a trial use application request is output to the in-building information visualization apparatus 1 through the communication network 5 (K03). At this time, the trial application/demonstration experience execution screen 301 is in a standby state until receiving a processing response from the in-building information visualization apparatus 1.

[0074]

The standby state means transitioning to a request processing screen (not shown) or setting the screen in a disabled state and displaying a message instructing the customer to wait for a while in a pop-up window or the like.

[0075]

In response to the trial use application request, the trial permission unit 16 of the in-building information visualization apparatus 1 refers to the customer information DB 12a to confirm the customer ID of the customer "○○ management association", the building ID of the elevator having the service-level agreement, and the elevator ID. That is, the in-building information visualization apparatus 1 identifies the building ID

corresponding to the customer ID or the user ID included in the access request, and, as described with reference to Fig. 7, registers the function number and the function name to be used on a trial basis, the trial use application date, and the like in the trial use application DB 12f (K04).

[0076]

After updating the initial setting information DB 12d on the basis of the registration information in the trial use application DB 12f, the collection/setting processing unit 13 is connected to the elevator monitoring/control apparatus 21 through the communication network 4 and transmits the initial setting information thereto (K05). Based on the received initial setting information, the elevator monitoring/control apparatus 21 sets enabling or disabling of each function of the elevator in the elevator, thereby permitting control performed when a condition for executing the enabled function is satisfied and demonstration experience control performed in response to a request from the customer (K06). Herein, the function whose trial use application has been made is set to be enabled.

[0077]

When the initial setting to the elevator monitoring/control apparatus 21 is completed, the

recommended function selection unit 15b of the in-building information visualization apparatus 1 combines the customer information DB 12a, the model function management DB 12b, the SLA function management DB 12c, the initial setting information DB 12d, the operation state DB 12e, and the trial use application DB 12f to extract information, adds an analysis result of a recommended function to the information, and outputs screen information to be displayed on the trial application/demonstration experience execution screen 301 of the customer operation terminal 3 from the visualization processing unit 14 (K07).

[0078]

The trial application/demonstration experience execution screen 301 in the standby state in the customer operation terminal 3 operated by the customer is configured to check whether a response is received from the visualization processing unit 14 of the in-building information visualization apparatus 1 constantly or at regular intervals (K08). As a result of the check, in a case where a response of a result of the trial application is not received ("NO" in K08), the check processing in K08 is repeated until a response is received.

[0079]

In a case where a response of a result of the trial application is received ("YES" in K08) and the screen

information output from the visualization processing unit 14 is received by the trial application/demonstration experience execution screen 301 in the standby state in the customer operation terminal 3 operated by the customer, the display content of the trial application/demonstration experience execution screen 301 is updated (K09). At this time, the trial use button 3013 displayed in the function record of the function whose trial use application has been made is disabled and the demonstration experience button 3014 is enabled. Therefore, the customer can execute a demonstration experience.

[0080]

Next, a flow of a demonstration experience of the function whose trial use application has been made will be described.

After making the trial use application of the elevator function, the customer determines whether to experience a demonstration (K10). In a case where the customer does not experience the demonstration ("NO" in K10), the customer terminates the processing by, for example, closing the trial application/demonstration experience execution screen 301. In a case where the customer experiences the demonstration ("YES" in K10), the customer presses the demonstration experience button 3014 enabled on the trial application/demonstration experience

execution screen 301.

[0081]

In a case where the customer experiences the demonstration ("YES" in K10), the customer confirms the trial application/demonstration experience execution screen 301 and presses the demonstration experience button 3014 displayed in the function record of the function whose trial use application has been made. Then, a demonstration experience execution request is output to the in-building information visualization apparatus 1 through the communication network 5 (K11). By using a tablet, a smartphone, or the like as the customer operation terminal 3 to press the demonstration experience button 3014, it is possible to execute the demonstration in the elevator hall or the car. This makes it possible to execute the demonstration at an appropriate timing.

[0082]

In the present embodiment, the processing is performed in real time in order to experience the demonstration at an appropriate timing. However, the customer may arbitrarily register an execution schedule for the demonstration experience.

[0083]

In response to the demonstration experience execution request, the trial permission unit 16 of the in-

building information visualization apparatus 1 refers to the customer information DB 12a to confirm the customer ID of the customer "oo management association", the building ID of the elevator having the service-level agreement, and the elevator ID. That is, the in-building information visualization apparatus 1 identifies the building ID corresponding to the customer ID or the user ID included in the access request, and, as described with reference to Fig. 7, the trial permission unit 16 refers to the initial setting information DB 12d, confirms that the function whose execution request has been made is enabled, acquires demonstration control execution command information from the demonstration experience control DB 12g by using the elevator model, the function number, and the function name as keys, transmits the demonstration control execution command information to the collection/setting processing unit 13 (K12), is connected to the elevator monitoring/control apparatus 21 through the communication network 4 from the collection/setting processing unit 13, and transmits the demonstration control execution command information thereto (K13).

[0084]

The elevator monitoring/control apparatus 21 executes the demonstration experience control of the elevator function on the basis of the received

demonstration control execution command information (K14).
When the elevator operates in accordance with the
demonstration experience control, the customer can
experience the function of the elevator (K15).

[0085]

Even if the demonstration experience control is not
executed, when the condition for executing the elevator
function is satisfied, the function whose trial use
application has been made can be experienced by this
control provided in the elevator.

[0086]

An expiration period is set for the trial use
application, and thus the trial permission unit 16
constantly or periodically checks whether the expiration
period has expired (K16). In a case where the expiration
period has not expired (NO in K16), the function whose
trial use application has been made and the demonstration
experience are maintained in an executable state, and the
check processing in K16 is repeated. In a case where the
expiration period has expired (YES in K16), the trial
permission unit 16 updates the initial setting information
DB 12d so as to disable the setting of the function used on
a trial basis and sets the updated content in the elevator
monitoring/control apparatus 21 (K17), and the elevator
monitoring/control apparatus 21 disables the function whose

trial use application has been made (K18).

[0087]

The customer is notified that the trial use period has been terminated (K19). It is desirable to transmit the notification to an e-mail address registered as the customer information or to display the notification on the trial application/demonstration experience execution screen 301. A method of displaying the notification on the trial application/demonstration experience execution screen 301 is, for example, disabling the trial use button 3013 and the demonstration experience button 3014 and displaying a message such as "Trial use expired".

[0088]

In Fig. 9, in a case where the customer executes the trial use application and the expiration period of the trial use expires, an event notification may be transmitted to the system administrator or the sales representative.

[0089]

According to the embodiments described above, the elevator function trial control system disclosed herein is a building facility management system including a monitoring unit configured to monitor a building facility, the building facility management system including: a recording unit configured to record building facility information including information regarding a type of the

building facility, a monitoring result by the monitoring unit, service menu information including information regarding a maintenance service, and contract information of the maintenance service; a recommended function selection unit configured to select a recommended function from the service menu information outside a scope of the contract by using the building facility information, the monitoring result, the service menu information, and the contract information; and an output unit configured to output the recommended function selected by the recommended function selection unit.

With this configuration and operation, it is possible to efficiently provide information regarding the function of the building facility.

Specifically, it is possible to accurately display buttons for trial use application and demonstration experience execution on the customer operation terminal in accordance with a state of the service-level agreement and the model and function of the elevator, thereby allowing the customer to experience a demonstration of the function whose trial use application has been made by the customer in the elevator owned by the customer. Further, it is possible to propose a recommended function by analyzing the operation state of the elevator, and, by providing the customer with information necessary for reviewing the

service and the service-level agreement, it is possible to expect an effect of encouraging the customer to update to a higher service-level agreement SLA.

[0090]

The present invention is not limited to the above-described embodiments and modification examples and includes various other modification examples. For example, the above-described embodiments have been described in detail in order to easily understand the present invention and are not necessarily limited to those having all the described configurations. It is possible to replace a part of a configuration of one embodiment with a configuration of another embodiment and to add a configuration of another embodiment to a configuration of one embodiment. It is also possible to add, remove, and replace another configuration to, from, and with a part of the configuration in each embodiment.

[0091]

Further, in the above embodiments, the elevator has been described as an example of the building facility, but the same applies to other building facilities.

Examples of the facilities in the building other than the elevator include an air conditioning apparatus, a lighting apparatus, and a security gate, and the present invention is also applicable to those apparatuses.

For example, in a case where the present invention is applied to management of lighting and air conditioning facilities, it is possible to acquire "long time operation of the lighting and air conditioning facilities" as a monitoring result and propose "visualization of energy consumption", "remote control (control according to the number of users)", or the like as a recommended service. If the recommended service is used, an effect of reducing unnecessary operation and costs is expected.

What is claimed is:

1. A building facility management system including a monitoring unit configured to monitor a building facility, the building facility management system comprising:

a recording unit configured to record building facility information including information regarding a type of the building facility, a monitoring result by the monitoring unit, service menu information including information regarding a maintenance service, and contract information of the maintenance service;

a recommended function selection unit configured to select a recommended function from the service menu information outside a scope of the contract by using the building facility information, the monitoring result, the service menu information, and the contract information; and

an output unit configured to output the recommended function selected by the recommended function selection unit.

2. The building facility management system according to claim 1, further comprising

an available function generation unit configured to calculate a providable service menu providable for a user on the basis of the building facility information and the service menu information,

wherein the recommended function selection unit selects the recommended function from the providable service menu outside the scope of the contract.

3. The building facility management system according to claim 1, wherein in a case where a plurality of recommended functions is selected by the recommended function selection unit, the output unit prioritizes the plurality of recommended functions and outputs a high-priority recommended function.

4. The building facility management system according to claim 2, further comprising a trial permission unit configured to permit a trial of the recommended function output by the output unit.

5. The building facility management system according to claim 4, wherein the trial permission unit allows the recommended function specified to be available only for a predetermined period.

6. The building facility management system according to claim 4, wherein the trial permission unit allows the recommended function specified to be available only for a predetermined period and allows a simulated operation to be performed in a case where the specified function is of a specific type.

7. The building facility management system according to claim 4, wherein

based on a detection history of abnormality that hinders an operation of an elevator serving as the building facility, the recommended function selection unit selects a function for the abnormality as the recommended function, and

the trial permission unit causes a simulated operation of the recommended function to be performed on the assumption that the abnormality occurs.

8. The building facility management system according to claim 1, wherein the recommended function selection unit displays and outputs the recommended function in association with information based on which the recommended function is selected.

9. The building facility management system according to claim 1, wherein the maintenance service can be added, and the recommended function selection unit selects the recommended function from latest maintenance services.

10. The building facility management system according to claim 1, wherein the recommended function selection unit selects the recommended function by further using a contract status of the maintenance service in another building.

11. A building facility management method in which a building facility is monitored, the method comprising:

a recording step of recording building facility

information including information regarding a type of the building facility, a monitoring result, service menu information including information regarding a maintenance service, and contract information of the maintenance service;

a recommended function selection step of selecting a recommended function from the service menu information outside a scope of the contract by using the building facility information, the monitoring result, the service menu information, and the contract information; and

an output step of outputting the recommended function selected in the recommended function selection step.