Remote management system for building installations

The present invention relates to a remote management system for building installations comprising: at least one malfunction sensor (10a-f) to sense a malfunction of at least one building installation (50a-f); a local controller (20) to transmit a malfunction message based on a sensing signal from the malfunction sensor (10a-f); a memory (30) to store information on receivers (60d, 61d, 62d) to receive a predetermined malfunction message for each of the building installations (50a-f) and on receiving means (60a-62d) of the receivers (60d, 61d, 62d), the receiving means (60a-62d) having an appointed receiving order; a central controller (40) to transmit the malfunction message to the receiving means (60a-62d) of the prior order of a receiver (60d, 61d, 62d) of a building installation (50a-f) for which the malfunction message is transmitted, based on the memory (30), if the malfunction message is received from the local controller (20), and the receiving means (60a-62d) transmitting a receipt-confirmation information to the central controller (40) if the receiver (60d, 61d, 62d) confirms the received malfunction message, and the central controller (40) transmitting the malfunction message to the receiving means (60a-62d) of the next order if the receiving means (60a-62d) of the prior order does not transmit the receipt-confirmation information in a predetermined waiting time after the central controller (40) transmits the malfunction message to the receiving means (60a-62d) of the prior order. Thus, according to the present invention, the engineer may rapidly confirm the malfunction of the building installations (50a-f).
Description

[0001] The present invention relates to a remote management system for building installations, and more particularly to a remote management building installations in which an engineer may rapidly confirm a malfunction of a building installation.

[0002] The remote management system for building installations is a system to remotely watch and control malfunctions and operations of a plurality of building installations.

[0003] As shown in FIG. 1, a conventional remote management system for building installations 100 comprises a plurality of malfunction sensors 101a−101f, a local controller 102 and a central controller 103.

[0004] The malfunction sensors 101a−101f sense malfunctions of the building installations 104a−104f. Here, the building installations 104a−104f comprise all of installations providing a convenience for using the building such as doors, air cleaners, air conditioners, elevators, escalators and the like. The central controller 103 transmits the malfunction message to the central controller 103.

[0005] A sensing signal from each of the plurality of malfunction sensors 101a−101f is transmitted to the local controller 102, which transmits the malfunction message of the building installations 104a−104f to the central controller 103.

[0006] The central controller 103 transmits a malfunction message to a corresponding engineer who should check and repair the malfunction of each of the building installations 104a−104f if the local controller 102 transmits the malfunction message to the central controller. Each of the engineers has a receiving means 105a−105c such as a telephone number, E-mail address or the like. The central controller 103 transmits the malfunction message to the receiving means of the proper engineer based on the malfunction message.

[0007] However, in the conventional remote management system for building installations 100, the central controller 103 doesn’t recognize whether the engineer confirms the malfunction message. Further, if the engineer cannot obtain access to the receiving means 105a−105c, the central controller 103 cannot transmit the malfunction message to the engineer. Thus, a malfunction that should be urgently repaired may be neglected for a long time, which may cause a serious accident.

[0008] According to the present invention there is provided an apparatus and method as set forth in the appended claims. Preferred features of the invention will be apparent from the dependent claims, and the description which follows.

[0009] Accordingly, it is an aspect of the present invention to provide a remote management building installations in which a malfunction message can be transmitted to an engineer with efficiency.

[0010] The foregoing and/or other aspects of the present invention are achieved by a remote management system for building installations comprising: at least one malfunction sensor to sense a malfunction of at least one building installation; a local controller to transmit a malfunction message based on a sensing signal from the malfunction sensor; a memory to store information on receivers to receive a predetermined malfunction message for each of the building installations and on receiving means of the receivers, the receiving means having an appointed receiving order; a central controller to transmit the malfunction message to the receiving means of the prior order of a receiver of a building installation for which the malfunction message is transmitted, based on the memory, if the malfunction message is received from the local controller, and the receiving means transmitting a receipt-confirmation information to the central controller if the receiver confirms the received malfunction message, and the central controller transmitting the malfunction message to the receiving means of the next order if the receiving means of the prior order does not transmit the receipt-confirmation information in a predetermined waiting time after the central controller transmits the malfunction message to the receiving means of the prior order.

[0011] According to an aspect, the central controller waits for the receipt-confirmation information from the receiving means of the next order no more if the receiving means of the prior order transmits the receipt-confirmation information within the predetermined waiting time after the central controller transmits the malfunction message to the receiving means of the next order.

[0012] According to an aspect, the memory stores information on the receivers for each of the building installations, each of the receivers having an appointed receiving order, and the central controller transmits the malfunction message to the receiving means of the prior order for the receiver of the next order if all of the receiving means of the receiver of the prior order don’t transmit the receipt-confirmation information.

[0013] According to an aspect, the central controller waits for the receipt-confirmation information from the receiver of the next order no more if the receiving means of the receiver of the prior order transmits the receipt-confirmation information within the predetermined waiting time after the central controller transmits the malfunction message to the receiving means of the prior order for the receiver of the next order.

[0014] According to an aspect, the memory stores information on the receiver for each of the building installations, each of the receivers having an appointed receiving order, and the central controller transmits the malfunction message to the receiving means of the prior order for the receiver of the next order if all of the receiving means of the receiver of the prior order don’t transmit the receipt-confirmation information.

[0015] According to an aspect, the central controller waits for the receipt-confirmation information from the receiver of the next order no more if the receiving means of the receiver of the prior order transmits the receipt-confirmation information within the predetermined waiting time after the central controller transmits the malfunction message to the receiving means of the prior order.
According to an aspect, the receiving means comprise a telephone, and the central controller transmits the malfunction message to the telephone.

These and/or other aspects and advantages of the invention will become apparent and more readily appreciated from the following description of the preferred embodiments, taken in conjunction with the accompanying drawings of which:

FIG. 1 is a schematic block diagram showing a structure of a conventional remote management system for building installations;

FIG. 2 is a schematic block diagram showing a structure of a remote management system for building installations according to an embodiment of the present invention;

FIG. 3 shows a information data structure tree of receivers and receiving means each having an appointed receiving order to receive a malfunction message for each of building installations; and

FIG. 4 shows a information data structure tree of receivers each having an appointed receiving order and receiving means to receive a malfunction message per a building installation.

Reference will now be made in detail to the present preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings, wherein like reference numerals refer to the like elements throughout. The embodiments are described below in order to explain the present invention by referring to the figures.

As shown in FIG. 2, a remote management system for building installations 1 according to an embodiment of the present invention comprises malfunction sensors 10a—10f, a local controller 20, a memory 30 and a central controller 40.

The malfunction sensors 10a—10f sense malfunctions of building installations 50a—50f and generate malfunction sensing signals if malfunctions are caused. Here, the building installations 50a—50f comprise all of installations providing a convenience for using the building such as doors, air cleaners, air conditioners, elevators, escalators and the like. Thus, the malfunction sensors 10a—10f may be implemented as a variety of devices according to a cause of the malfunction, a state of the malfunction of the building installations 50a—50f and the like. For example, malfunction sensors 10a—10f may be variably implemented as a switch, a temperature sensor, an air filter, a power supply sensor, a cutoff or the like according to the building installations 50a—50f.

The local controller 20 transmits a malfunction message based on sensing signals from the malfunction sensors 10a—10f. Here, the malfunction message may include a building installation in which malfunction is caused, malfunction symptoms and the like.

The memory 30 stores information including engineers and receiving means 60a—62c to receive the malfunction message if a malfunction is caused according to each of the building installations 50a—50f or each of the malfunction symptoms. As shown in a tree of FIG. 3, an engineer to check-out and repair each of the building installations 50a—50f is stored as a receiver 60d, 61d and 62d and receiving means 60a—62c are linked to the receivers 60d, 61d and 62d. Each of the receiving means 60a—62c has an appointed receiving order as a branch of the receivers 60d, 61d and 62d.

Here, each of the receiving means 60a—62c transmits a receipt-confirmation information if each of the receivers 60d, 61d and 62d confirms a predetermined malfunction message. A variety of receiving means may be employed for the receiving means 60a—62c according to a communication means. For example, if a malfunction message is transmitted by E-mail, the receiving means 60a—62c may be a computer terminal. If a malfunction message is received by a mobile communication means such as a cellular phone, the malfunction message may be transmitted through a short message service (SMS) or a voice message.

If the malfunction message is transmitted from the local controller 20, the central controller 40 searches a proper receiver among the receivers 60d, 61d and 62d and receiving means of the prior order 60a, 61a, or 62a among the receiving means from the memory 30 and transmits the malfunction message to the receiving means of the prior order of the proper receiver. The receiving means of the prior order checks whether the receiver confirms the transmitted malfunction message. The receiving means of the prior order transmits the receipt-confirmation information to the central controller 40 if the receiver confirms the malfunction message.

The central controller 40 operates a timer after the central controller 40 transmits the malfunction message and checks whether the receipt-confirmation information is received in a predetermined waiting-time. If the receipt-confirmation information is not received in the predetermined waiting time, the central controller 40 searches a receiving means of the next order 60b, 61b or 62b. Then, the central controller 40 transmits the malfunction message to the searched receiving means.

At the receiving means of the next order 60b, 61b or 62b to which the malfunction message is transmitted, the same process as the above process is accomplished. If the receipt-confirmation information is not received by the receiving means of the next order 60b, 61b and 62b the central controller 40 transmits the malfunction message to the receiving means of the order after the next 60c, 61c and 62c.

While the central controller 40 is checking whether the receiving means of the next order or the order after the next transmits the receipt-confirmation
information, the receipt-confirmation information from the receiving means of the prior order may be received to the central controller 40. Then, it is considered that a corresponding engineer receives the malfunction message and accordingly the receipt-confirmation information may be waited no more.

[0028] If the receipt-confirmation information is not received from all of receiving means for an engineer, the malfunction message may be transmitted to all of the receiving means for the engineer again. However, the retransmission of the malfunction message cannot guarantee a malfunction message confirmation of the engineer.

[0029] Thus, as an aspect of the present invention, the memory 30 may store classified information on receivers as a plurality of engineers having an appointed receiving order according to each of building installations 50a–50f or according to each of malfunction symptoms.

[0030] As shown in FIG. 4, the central controller 40 transmits the malfunction message to the receiver A1 corresponding to the receiving order of the building installation A. The central controller 40 transmits the malfunction message to the receiving means linked to the receiver A1 according to the receiving order.

[0031] If the receipt-confirmation information is not received from receiving means A3 of the lowest order, the central controller 40 searches a receiver the next order. The central controller 40 transmits the malfunction message to the receiving means of the next order receiver A2 according to the receiving order and the same process for the receiver of the prior order is repeated.

[0032] While the central controller 40 is waiting for the receipt-confirmation information from the receiver of the next order, the receipt-confirmation information may be received from the receiving means of the receiver of the prior order. Then, it is considered that the corresponding engineer receives the malfunction message and the receipt-confirmation information from the receiver of the next order is waited no more. It is required to inform the receiver of the next order of the normal transmission of the malfunction message to the receiver of the prior order.

[0033] Information on receivers, receiving means and receiving order that are stored in the memory 30 may be changeable. For example, if the receiving means of an engineer is stored as a cellular phone and a phone number is changed, the central controller 40 receives the changed information and changes the data of the memory 30. Further, the receiving order of the engineers may be changed according to a service schedule.

[0034] The data stored according to each of building installations as shown in FIGS. 3 and 4 may be divided according to the malfunction symptoms. The application may be applied to the building installations at the same time.

[0035] According to the present invention, the engineer may rapidly confirm the malfunction of the building installations.

[0036] Although a few embodiments of the present invention have been shown and described, it would be appreciated by those skilled in the art that changes may be made in this embodiment without departing from the principles and spirit of the invention, the scope of which is defined in the claims and their equivalents.

[0037] Attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

[0038] All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

[0039] Each feature disclosed in this specification (including any accompanying claims, abstract and drawings) may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

[0040] The invention is not restricted to the details of the foregoing embodiment(s). The invention extends to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

Claims

1. A remote management system for building installations comprising:

- at least one malfunction sensor (10a-f) to sense a malfunction of at least one building installation (50a-f);
- a local controller (20) to transmit a malfunction message based on a sensing signal from the malfunction sensor (10a-f);
- a memory (30) to store information on receivers (60d, 61d, 62d) to receive a predetermined malfunction message for each of the building installations (50a-f) and on receiving means (60a-62c) of the receivers (60d, 61d, 62d), the receiving means (60a-62c) having an appointed receiving order;
- a central controller (40) to transmit the malfunction message to the receiving means (60a-62c) of the prior order of a receiver (60d, 61d, 62d) of a building installation (50a-f) for which the malfunction message is transmitted, based on
the memory (30), if the malfunction message is received from the local controller (20), and the receiving means (60a-62c) transmitting a receipt-confirmation information to the central controller (40) if the receiver (60d, 61d, 62d) confirms the received malfunction message, and the central controller (40) transmitting the malfunction message to the receiving means (60a-62c) of the next order if the receiving means (60a-62c) of the prior order does not transmit the receipt-confirmation information within a predetermined waiting time after the central controller (40) transmits the malfunction message to the receiving means (60a-62c) of the prior order.

2. The remote management system for building installations according to claim 1, wherein the central controller (40) waits for the receipt-confirmation information from the receiving means (60a-62c) of the next order no more if the receiving means (60a-62c) of the prior order transmits the receipt-confirmation information within the predetermined waiting time after the central controller (40) transmits the malfunction message to the receiving means (60a-62c) of the prior order.

3. The remote management system for building installations according to claim 1 or claim 2, wherein the memory (30) stores information on the receivers (60d, 61d, 62d) for each of the building installations, each of the receivers (60d, 61d, 62d) having an appointed receiving order, and the central controller (40) transmits the malfunction message to the receiving means (60a-62c) of the prior order for the receiver (60d, 61d, 62d) of the next order if all of the receiving means (60a-62c) of the receiver (60d, 61d, 62d) of the prior order do not transmit the receipt-confirmation information.

4. The remote management system for building installations according to claim 3, wherein the central controller (40) waits for the receipt-confirmation information from the receiver (60d, 61d, 62d) of the next order no more if the receiving means (60a-62c) of the receiver (60d, 61d, 62d) of the prior order transmits the receipt-confirmation information within the predetermined waiting time after the central controller (40) transmits the malfunction message to the receiving means (60a-62c) of the receiver (60d, 61d, 62d) of the next order.

5. The remote management system for building installations according to claim 2, wherein the memory (30) stores information on the receiver (60d, 61d, 62d) for each of the building installations (50a-f), each of the receivers (60d, 61d, 62d) having an appointed receiving order, and the central controller (40) transmits the malfunction message to the receiving means (60a-62c) of the prior order for the receiver (60d, 61d, 62d) of the next order if all of the receiving means (60a-62c) of the receiver of the prior order do not transmit the receipt-confirmation information.

6. The remote management system for building installations according to claim 5, wherein the central controller (40) waits for the receipt-confirmation information from the receiver (60d, 61d, 62d) of the next order no more if the receiving means (60a-62c) of the receiver (60d, 61d, 62d) of the prior order transmits the receipt-confirmation information within the predetermined waiting time after the central controller (40) transmits the malfunction message to the receiving means (60a-62c) of the receiver (60d, 61d, 62d) of the next order.

7. The remote management system for building installations according to any preceding claim, wherein the receiving means comprise a telephone, and the central controller (40) transmits the malfunction message as a predetermined voice message to the telephone.
<table>
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The present search report has been drawn up for all claims.

**Categories of Cited Documents:***
- T: theory or principle underlying the invention
- E: earlier patent document, but published on, or after the filing date
- D: document cited in the application
- L: document cited for other reasons
- A: member of the same patent family, corresponding document
- X: particularly relevant if taken alone
- Y: particularly relevant if combined with another document of the same category
- O: non-written disclosure
- P: intermediate document

**Place of search:** The Hague  
**Date of completion of the search:** 3 February 2005  
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