

MAINTENANCE MANAGEMENT SYSTEM AND METHOD

Technical Field

[0001] The present invention relates generally to a maintenance management system and method.

Background

[0002] Generally, components within most systems require regular maintenance of one form or another. Such maintenance may include replacement of the component, or a sub-component, after a predefined period of operation. Other maintenance may include inspection of the component, typically also after a predefined period of operation. Yet further maintenance may merely include cleaning the component.

[0003] Other than “routine” maintenance, maintenance is also performed on an “on-demand” basis. With different components having different maintenance requirements, scheduling such maintenance is often a very complex problem. The manner in which such scheduling is typically performed either results in too much maintenance or not enough maintenance. Also, the scheduled maintenance is typically not adaptive to the status or frequency of use of the system.

[0004] A need exists for a maintenance management system to assist in the scheduling of maintenance.

Summary

[0005] ~~It is an object~~Embodiments of the present invention seek to substantially overcome, or at least ameliorate, one or more disadvantages of existing arrangements, or to at least provide the public with a useful choice.

[0006] Disclosed is a maintenance management system comprising:

a processing device;

a plurality of components in communication with the processing device, each component being identified by a unique identifier and having 3-dimensional a location associated with the component and one or more sensors for capturing usage data associated with the component, wherein the 3-dimensional location for the component is determined by an indoor positioning system device, and wherein the usage data relates to a flow rate associated with the component; and

one or more user devices in communication with the processing device,

wherein the usage data of components is communicated to the processing device and the processing device determines from the usage data whether any of the components requires maintenance by determining if the flow rate is outside predefined parameters, where the location of each respective component requiring maintenance is communicated to at least one of the one or more user devices from the processing device,

wherein, when more than one component requires maintenance, a list ordered in an order to optimize the maintenance is presented on ~~the a~~ user device, and further wherein an App or server determines ~~an the~~ order ~~which minimizes to minimize~~ travel time between the locations, and

wherein the App or server is configured to generate a detailed geographical mapping in a 3-dimensional schematic of the building being monitored that is displayed on the user device with directions to the 3-dimensional location of the component from a current location, wherein the current location is determined using an indoor positioning system device of the user device.

~~wherein the system further comprises:~~

~~a timer, the timer counting down from a pre-determined amount of time, wherein the timer is started when the one or more sensors of a component requiring maintenance are de-activated, and wherein, when the timer has elapsed, the one or more sensors are re-activated and the component requiring maintenance is removed from the list.~~

[0007] There is also disclosed a computer implemented maintenance management method comprising the steps of:

capturing usage data associated with respective components, each component being identified by a unique identifier and having a 3-dimensional location associated with the component, wherein the 3-dimensional location for the component is determined by an indoor positioning system device, and wherein the usage data relates to a flow rate associated with the component;

communicating the usage data;

determining from the usage data whether any of the components requires maintenance by determining if the flow rate is outside predefined parameters; ~~and~~

communicating the location of each respective component requiring maintenance to at least one user device,

wherein, when more than one component requires maintenance, the method further comprises presenting on ~~the a~~ user device a list ordered in an order to optimize the maintenance, and wherein an App or server determines ~~an the~~ order ~~which minimizes to minimize~~ travel time between the locations, and

generating a detailed geographical mapping in a 3-dimensional schematic of the building being monitored that is displayed on the user device with directions to the 3-dimensional location of the component from a current location, wherein the current location is determined using an indoor positioning system device of the user device.

~~counting down from a pre-determined amount of time using a timer, wherein the timer is started when one or more sensors of a component requiring maintenance are de-activated, and wherein, when the timer has elapsed, the one or more sensors are re-activated and the component requiring maintenance is removed from the list.~~

Brief Description of the Drawings

[0008] At least one embodiment of the present invention will now be described with reference to the drawings and appendices, in which:

[0009] Figure 1 shows a Bathroom Maintenance Management System according to the present disclosure;

[0010] Figure 2 shows a schematic flow diagram of a method 200 of managing maintenance; and

[0011] Figure 3 illustrates locations of component requiring maintenance being displayed within a 3 dimensional schematic of a building.

Detailed Description including Best Mode

[0012] Figure 1 shows a system 100 according to the present disclosure. In the preferred implementation the system 100 is a Bathroom Maintenance Management System. System 100 includes a server 110 connected to a network 120. The network 120 is typically an Ethernet Local Area Network (LAN). The server 110 has one or more processors (not illustrated) and data storage devices (not illustrated). The operation of the server 110 is controlled through software instructions stored on the data storage devices and executed by the processor(s).

[0013] The system 100 further includes a number of components 150_1 to 150_N , each having a processor (not illustrated) connected to the network 120. In the preferred implementation the components 150_1 to 150_M are bathroom components, such as faucets, toilets, urinals, showers, etc.

CLAIMS

1. A maintenance management system comprising:

a processing device;

a plurality of components in communication with the processing device, each component being identified by a unique identifier and having a 3-dimensional location associated with the component and one or more sensors for capturing usage data associated with the component, wherein the 3-dimensional location for the component is determined by an indoor positioning system device, and wherein the usage data relates to a flow rate associated with the component;
and

one or more user devices in communication with the processing device,

wherein the usage data of components is communicated to the processing device and the processing device determines from the usage data whether any of the components requires maintenance by determining if the flow rate is outside predefined parameters, where the location of each respective component requiring maintenance is communicated to at least one of the one or more user devices from the processing device,

wherein, when more than one component requires maintenance, a list ordered in an order to optimize the maintenance is presented on ~~the a~~ user device, and further wherein an App or server determines ~~an the~~ order ~~which minimizes to minimize~~ travel time between the locations, and

wherein the App or server is configured to generate a detailed geographical mapping in a 3-dimensional schematic of the building being monitored that is displayed on the user device with directions to the 3-dimensional location of the component from a current location, wherein the current location is determined using an indoor positioning system device of the user device.

~~wherein the system further comprises:~~

~~a timer, the timer counting down from a pre-determined amount of time, wherein the timer is started when the one or more sensors of a component requiring maintenance are de-activated, and wherein, when the timer has elapsed, the one or more sensors are re-activated and the component requiring maintenance is removed from the list.~~

2. The maintenance management system according to claim 1 wherein the processing device further determines a maintenance person relevant to the type of maintenance required, and the location of each respective component requiring maintenance is communicated to ~~the a~~ user device of the maintenance person relevant to the type of maintenance required.

3. The maintenance management system according to claim 1 or 2 wherein at least one of the components includes a location determining device for determining the location associated with the component.

4. The maintenance management system according to any ~~one of claims 1 to 3~~preceding claims, wherein at least one of the components requires maintenance when the usage data exceeds a predetermined threshold.

~~5. The maintenance management system according to any one of claims 1 to 3, wherein at least one of the components requires maintenance when the usage data is outside predefined parameters.~~

~~65.~~ The maintenance management system according to any preceding ~~claim 4~~, wherein the order is determined on the basis of:

the location associated with the component, and

a location of a maintenance person relevant to a type of maintenance required.

~~76.~~ The maintenance management system according to claim ~~65~~, wherein the order is further determined on the basis of an urgency of the component requiring maintenance, wherein the urgency is determined on the basis of:

a time that has elapsed since the processing device determined that the component requires maintenance; and

the usage data captured from the one or more sensors associated with the component.

~~7. The maintenance management system according to any preceding claim, wherein the system further comprises:~~

~~a timer, the timer counting down from a pre-determined amount of time, wherein the timer is started when the one or more sensors of a component requiring maintenance are deactivated, and wherein, when the timer has elapsed, the one or more sensors are re-activated and the component requiring maintenance is removed from the list.~~

8. The maintenance management system according to claim ~~4~~7, wherein the one or more sensors are a plurality of sensors in a single location.

9. A computer implemented maintenance management method comprising the steps of: capturing usage data associated with respective components, each component being identified by a unique identifier and having a 3-dimensional location associated with the component, wherein the 3-dimensional location for the component is determined by an indoor positioning system device, and wherein the usage data relates to a flow rate associated with the component;

communicating the usage data;

determining from the usage data whether any of the components requires maintenance by determining if the flow rate is outside predefined parameters; and

communicating the location of each respective component requiring maintenance to at least one user device,

wherein, when more than one component requires maintenance, the method further comprises presenting on ~~the a~~ user device a list ordered in an order to optimize the maintenance, and wherein an App or server determines an the order ~~which minimizes to~~ minimize travel time between the locations, and

generating a detailed geographical mapping in a 3-dimensional schematic of the building being monitored that is displayed on the user device with directions to the 3-dimensional location of the component from a current location, wherein the current location is determined using an indoor positioning system device of the user device.

~~counting down from a pre-determined amount of time using a timer, wherein the timer is started when one or more sensors of a component requiring maintenance are de-activated, and wherein, when the timer has elapsed, the one or more sensors are re-activated and the component requiring maintenance is removed from the list.~~

10. The maintenance management method according to claim 9, further comprising the step of determining a maintenance person relevant to the type of maintenance required, wherein the location of each respective component requiring maintenance is communicated to ~~the a~~ user device of the maintenance person relevant to the type of maintenance required.

11. The maintenance management method according to claim 9 or claim 10, wherein at least one of the components requires maintenance when the usage data exceeds a predetermined threshold.

~~12. The maintenance management method according to claim 9 or 10, wherein at least one of the components requires maintenance when the usage data is outside predefined parameters.~~

~~13~~12. The maintenance management method according to any one of claims 9 to 11, wherein the order is determined on the basis of:

the location associated with the component, and

a location of the maintenance person relevant to the type of maintenance required.

~~14~~13. The maintenance management method according to claim ~~13~~12, wherein the order is further determined on the basis of an urgency of the component requiring maintenance, wherein the urgency is determined on the basis of:

a time that has elapsed since the processing device determined that the component requires maintenance; and

the usage data captured from the one or more sensors associated with the component.

14. The maintenance management method according to any of claims 9 to 13, further comprising:

counting down from a pre-determined amount of time using a timer, wherein the timer is started when the one or more sensors of a component requiring maintenance are de-activated, and wherein, when the timer has elapsed, the one or more sensors are re-activated and the component requiring maintenance is removed from the list.

15. The maintenance management method according to claim ~~9~~14, wherein the one or more sensors are a plurality of sensors in a single location.