

ILLUMINATION SYSTEM BASED ON INTERNET OF THINGS

TECHNICAL FIELD

The present invention relates to the field of intelligent illumination technologies, and in particular, to an illumination system based on the Internet of Things.

BACKGROUND

In modern society, illumination of roads and rooms not only represents a scientific development degree of society, but also is closely related to people's life. LED illumination is widely used because of its prominent advantages such as energy saving, low carbon, no pollution, long service life, a small size, fast response, and rich colors. In the society, a requirement for illumination is no longer only a lighting requirement, but is a higher requirement for a lamplight color, artistry, a lighting rate, lamp turn-on/off accuracy, real-time performance of fault maintenance, timeliness of maintenance, and the like. The LED lighting industry urgently needs to comprehensively improve an illumination technology level and service level through technical transformation by using modern science and technologies, to satisfy demands of urban and rural construction and development in a new situation.

Most existing illumination light control modes are manual modes or time control modes. For a street lamp, if it is required to turn on/off the lamp according to a predetermined time, a timer is needed to be installed in a distribution box of the street lamp. Regardless of any seasonal meteorological condition, time is the only turn-on/off basis, while a manual control method is required for switches of some landscape lamps. A current method can neither timely adjust a time of turning on/off a lamp, nor timely reflect an operation condition of lighting facility, a failure rate is high, and maintenance is not convenient. With emergence of Internet of Things technologies, these problems above are resolved.

SUMMARY

An objective of the present invention is to provide an illumination system based on the Internet of Things, to remotely implement turn-on/off of an illumination lamp. The present invention is convenient to use, automatically adjusts luminance according to illumination intensity, and is energy-saving and environmentally friendly.

To achieve the above objective, the present invention provides the following technical solution.

An illumination system based on the Internet of Things includes a controller, a wireless communications module, a data server, a luminance sensor, an infrared sensor, and an illumination lamp status detection module, where

the luminance sensor is configured to acquire luminance information of an environment and send the luminance information to the data server; and the controller is configured to adjust turn-

on, luminance, and turn-off of an illumination lamp according to data acquired by the luminance sensor;

the infrared sensor is configured to acquire a quantity of pedestrians in the environment and send pedestrian information to the data server; the controller is further configured to adjust turn-on, the luminance, and turn-off of the illumination lamp according to data acquired by the infrared sensor;

the illumination lamp status detection module is configured to detect status information of the lamp and send the status information to the data server, where the status information includes luminance and an on/off state of the illumination lamp;

the data server is connected to the controller through the wireless communications module; and

the controller is configured to control turn-on, the luminance, and turn-off of the illumination lamp according to data information of the data server, where a uniquely determined identification code is configured for each illumination lamp, and the controller implements centralized control, zone control, or single-point control according to the identification code.

Optionally, the controller is further configured to adjust the luminance of the illumination lamp according to a time point, where luminance at each time point is preset; and the controller adjusts luminance of the illumination lamp at each time point according to the preset luminance.

Optionally, the controller controls, according to a preset turn-on time, the illumination lamp to be turned on; and the controller controls, according to a preset turn-off time, the illumination lamp to be turned off.

Optionally, when environment luminance acquired by the luminance sensor is less than a preset value and the illumination lamp is in an off state, the controller controls the illumination lamp to be turned on; and when the environment luminance acquired by the luminance sensor is greater than the preset value and the illumination lamp is in an on state, the controller controls the illumination lamp to be turned off.

Optionally, the illumination lamp status detection module is further configured to detect position information of the illumination lamp and send the position information to the data server; and the controller sends alarm information according to the position information stored in the data server.

Optionally, the illumination system further includes a video monitoring unit, connected to the data server, and configured to perform video monitoring on an environment around the illumination lamp and send a video monitoring result to the data server.

Optionally, when the infrared sensor does not acquire the pedestrian information, the controller

controls an illumination lamp in a current position to be turned off, and the illumination lamp is located at a corridor.

Optionally, the illumination system further includes a lamp fault detection module, connected to the data server, and configured to perform fault detection on an illumination lamp and send detection information to the data server; and the controller sends alarm information according to the detection information.

Optionally, the illumination system further includes a GPRS unit and a remote monitoring center, and the remote monitoring center is connected to the controller through the GPRS unit and is configured to send a control command to the controller.

According to specific embodiments provided in the present invention, the present invention discloses the following technical effects:

1. In the present invention, the Internet of Things is used to perform unique identification on each device for adjustment, timed turn-on/off and luminance adjustment of an illumination lamp can be implemented according to a time setting, and diversification of control modes such as zone control, centralized control, and single-point control can also be implemented.

2. In the present invention, turn-on and luminance of an illumination lamp can be automatically adjusted according to luminance and a quantity of pedestrians in an environment.

3. In the present invention, an illumination lamp status detection module is further configured, so that alarm information can be sent according to a status and a position of an illumination lamp, to remind a maintainer to perform maintenance.

4. In the present invention, a GPRS unit and a remote monitoring center are further configured, so that a controller can be remotely operated to control an illumination lamp.

BRIEF DESCRIPTION OF THE DRAWINGS

To describe the technical solutions in the embodiments of the present invention or in the prior art more clearly, the following briefly introduces the accompanying drawings required for describing the embodiments. Apparently, the accompanying drawings in the following description show merely some embodiments of the present invention, and a person of ordinary skill in the art may still derive other drawings from these accompanying drawings without creative efforts.

FIG. 1 is a structural connection diagram of Embodiment 1 of an illumination system based on the Internet of Things according to the present invention;

FIG. 2 is a structural connection diagram of Embodiment 2 of an illumination system based on the Internet of Things according to the present invention; and

FIG. 3 is a structural connection diagram of Embodiment 3 of an illumination system based on the Internet of Things according to the present invention.

DETAILED DESCRIPTION

The following clearly and completely describes the technical solutions in the embodiments of the present invention with reference to the accompanying drawings in the embodiments of the present invention. Apparently, the described embodiments are merely a part rather than all of the embodiments of the present invention. All other embodiments obtained by a person of ordinary skill in the art based on the embodiments of the present invention without creative efforts shall fall within the protection scope of the present invention.

To make objectives, features, and advantages of the present invention more comprehensible, the following describes the present invention in more detail with reference to accompanying drawings and specific implementations.

Embodiment 1

FIG. 1 is a structural connection diagram of Embodiment 1 of an illumination system based on the Internet of Things according to the present invention. As shown in FIG. 1, the illumination system includes a controller 1, a wireless communications module 2, a data server 3, a luminance sensor 4, an infrared sensor 5, and an illumination lamp status detection module 6.

The luminance sensor 4 is configured to acquire luminance information of an environment and send the luminance information to the data server 3; and the controller 1 is further configured to adjust turn-on, luminance, and turn-off of an illumination lamp according to data acquired by the luminance sensor 4.

The infrared sensor 5 is configured to acquire a quantity of pedestrians in the environment and send pedestrian information to the data server 3; and the controller 1 is further configured to adjust turn-on, the luminance, and turn-off of the illumination lamp according to data acquired by the infrared sensor 5.

The illumination lamp status detection module 6 is configured to detect status information of the lamp and send the status information to the data server 3, where the status information includes luminance and an on/off state of the illumination lamp.

The data server 3 is connected to the controller 1 through the wireless communications module 2.

The controller 1 is configured to control turn-on, the luminance, and turn-off of the illumination lamp according to data information of the data server 3, where a uniquely determined identification code is configured for each illumination lamp, and the controller 1 implements centralized control, zone control, or single-point control according to the identification code.

Specifically, the controller 1 is further configured to adjust the luminance of the illumination lamp according to a time point, where luminance at each time point is preset; and the controller 1

adjusts luminance of the illumination lamp at each time point according to the preset luminance.

The controller 1 controls, according to a preset turn-on time, the illumination lamp to be turned on; and the controller 1 controls, according to a preset turn-off time, the illumination lamp to be turned off.

When environment luminance acquired by the luminance sensor 4 is less than a preset value and the illumination lamp is in an off state, the controller 1 controls the illumination lamp to be turned on; and when the environment luminance acquired by the luminance sensor 4 is greater than the preset value and the illumination lamp is in an on state, the controller 1 controls the illumination lamp to be turned off.

The illumination lamp status detection module 6 is further configured to detect position information of the illumination lamp and send the position information to the data server 3; and the controller 1 sends alarm information according to the position information stored in the data server 3.

When the infrared sensor 5 does not acquire the pedestrian information, the controller 1 controls an illumination lamp in a current position to be turned off, and the illumination lamp is located at a corridor.

The illumination system further includes a video monitoring unit, connected to the data server 3, and configured to perform video monitoring on an environment around the illumination lamp and send a video monitoring result to the data server 3.

When the illumination lamp is arranged inside a room, the video monitoring unit may acquire video information of an environment, and when a person breaks into the room, the illumination lamp may be lightened up, and information about the person who breaks into the room may be acquired, for use by the public security organization for solving a case. Therefore, high security is achieved.

In this embodiment, the Internet of Things is used to perform unique identification on each device for adjustment, timed turn-on/off and luminance adjustment of an illumination lamp can be implemented according to a time setting to implement timed turn-on/off control and timed luminance adjustment and control, and diversification of control modes such as zone control, centralized control, and single-point control can also be implemented.

In this embodiment, turn-on and luminance of an illumination lamp can be automatically adjusted according to luminance and a quantity of pedestrians in an environment, to implement luminance sensing, adjustment and control.

Embodiment 2

FIG. 2 is a structural connection diagram of Embodiment 2 of an illumination system based on

the Internet of Things according to the present invention. As shown in FIG. 2, the illumination system includes a controller 1, a wireless communications module 2, a data server 3, a luminance sensor 4, an infrared sensor 5, an illumination lamp status detection module 6, and a lamp fault detection module 7.

The lamp fault detection module 7 is connected to the data server 3, and is configured to perform fault detection on an illumination lamp and send detection information to the data server 3; and the controller 1 sends alarm information according to the detection information.

In this embodiment, the illumination lamp status detection module 6 and the lamp fault detection module 7 are further configured, so that the alarm information can be sent according to a status and a position of the illumination lamp, to remind a maintainer to perform maintenance. When the illumination lamp falls off a lamp holder, the controller 1 sends lamp antitheft information to remind a worker to pay focused attention or performing processing.

Embodiment 3

FIG. 3 is a structural connection diagram of Embodiment 3 of an illumination system based on the Internet of Things according to the present invention. As shown in FIG. 3, the illumination system includes a controller 1, a wireless communications module 2, a data server 3, a luminance sensor 4, an infrared sensor 5, an illumination lamp status detection module 6, a GPRS unit 8, and a remote monitoring center 9, where the remote monitoring center 9 is connected to the controller 1 through the GPRS unit 8 and is configured to send a control command to the controller 1.

The remote monitoring center 9 may be a mobile phone, a tablet computer, or another communications device.

In this embodiment, the GPRS unit and the remote surveillance center are configured, so that remote monitoring can be implemented, and a control command is remotely sent to operate the controller, to control an illumination lamp.

Each embodiment of the present specification is described in a progressive manner, each embodiment focuses on the difference from other embodiments, and the same and similar parts between the embodiments may refer to each other.

Several examples are used for illustration of the principles and implementation methods of the present invention. The description of the embodiments is used to help illustrate the method and its core principles of the present invention. In addition, those skilled in the art can make various modifications in terms of specific embodiments and scope of application in accordance with the teachings of the present invention. In conclusion, the content of this specification shall not be construed as a limitation to the invention.

What is claimed is:

1. An illumination system based on the Internet of Things, wherein the illumination system comprises a controller, a wireless communications module, a data server, a luminance sensor, an infrared sensor, and an illumination lamp status detection module, wherein

the luminance sensor is configured to acquire luminance information of an environment and send the luminance information to the data server; and the controller is configured to adjust turn-on, luminance, and turn-off of an illumination lamp according to data acquired by the luminance sensor;

the infrared sensor is configured to acquire a quantity of pedestrians in the environment and send pedestrian information to the data server; the controller is further configured to adjust turn-on, the luminance, and turn-off of the illumination lamp according to data acquired by the infrared sensor;

the illumination lamp status detection module is configured to detect status information of the lamp and send the status information to the data server, wherein the status information comprises luminance and an on/off state of the illumination lamp; the illumination lamp status detection module is further configured to detect position information of the illumination lamp and send the position information to the data server;

the data server is connected to the controller through the wireless communications module; and

the controller is configured to control turn-on, the luminance, and turn-off of the illumination lamp according to data information of the data server, wherein a uniquely determined identification code is configured for each illumination lamp, and the controller implements centralized control, zone control, or single-point control according to the identification code;

the illumination system further comprises a lamp fault detection module, connected to the data server; the lamp fault detection module is configured to send alarm information according to the status information and the position information of the illumination lamp; when the illumination lamp falls off a lamp holder, the controller sends lamp antitheft information to a worker;

the illumination system further comprises a video monitoring unit, connected to the data server, and configured to perform video monitoring on an environment around the illumination lamp and send a video monitoring result to the data server;

when the illumination lamp is arranged inside a room, the video monitoring unit acquires video information of the environment, and when a person breaks into the room, the illumination lamp will be lightened up, and information about the person who breaks into the room will be acquired by the video monitoring unit.

2. The illumination system according to claim 1, wherein the controller is further configured to adjust the luminance of the illumination lamp according to a time point, wherein luminance at each time point is preset; and the controller adjusts luminance of the illumination lamp at each time point according to the preset luminance.

3. The illumination system according to claim 1, wherein the controller controls, according to a preset turn-on time, the illumination lamp to be turned on; and the controller controls, according to a preset turn-off time, the illumination lamp to be turned off.

4. The illumination system according to claim 1, wherein when environment luminance acquired by the luminance sensor is less than a preset value and the illumination lamp is in an off state, the controller controls the illumination lamp to be turned on; and when the environment luminance acquired by the luminance sensor is greater than the preset value and the illumination lamp is in an on state, the controller controls the illumination lamp to be turned off.

5. The illumination system according to claim 1, wherein when the infrared sensor does not acquire the pedestrian information, the controller controls an illumination lamp in a current position to be turned off, and the illumination lamp is located at a corridor.

6. The illumination system according to claim 1, wherein the illumination system further comprises a GPRS unit and a remote monitoring center, and the remote monitoring center is connected to the controller through the GPRS unit and is configured to send a control command to the controller.