By the way, recent elevator systems are controlled by electronic programs, which are becoming increasingly sophisticated and complex. Networks containing control devices that control the entire elevator are often controlled by proprietary communication protocols. Furthermore, the control boards incorporated in landing area control panels and elevator car control panel control panels may have different connectors and electronic components that make up the control boards for each network function due to changes in functions or additions of functions. Therefore, when changing or adding functions to a completed elevator system, it may be necessary to change and remake the software for each control device specification, or to re-install the program at the actual site. For hardware, it may be necessary to rebuild the entire control board, including the interface, and install it anew.

[0007]

If a completed elevator system has a pre-defined network that is designed to connect radio devices that enable wireless communication with mobile devices held by users, it is easy to install radio devices that are designed to connect to those networks. However, while a wireless device built to the standards of a particular elevator system can be easily adapted to elevators in other buildings that have the same elevator system as that particular elevator system, it cannot easily be adapted to other elevator systems that are not that particular elevator system. It is not easy to adapt the system to other elevator systems that are not same with that particular elevator system. Considering the recent sophistication and complexity of elevator systems, it is difficult to provide versatility to a wireless device that is made according to the standards of a particular elevator system. Therefore, the hurdle for renewing or refurbishing a completed elevator system, which is not a contactless system, into a contactless elevator system capable of wireless communication with a mobile device held by the user, is high. When introducing or operating a non-contact elevator system, not only are renewal and renovation costs associated with the installation of radio devices, but also maintenance work after installation, especially when repair or replacement is required due to malfunctions, is not easy to identify the location of the malfunction, which increases the downtime of the elevator due to each operation, and also increases maintenance and repair costs. This increases the downtime of the elevator as well as the cost of maintenance and repair. Furthermore, when installing a wireless device made according to the standards of a particular elevator system in an old building and elevator that is not compatible with a recent elevator system, the building itself may need to be renovated in conjunction with a major renewal of the elevator, resulting in a large financial burden. This is a problem.

[0008]

The purpose of this invention is to solve the problem of the conventional technology that a wireless device that enables wireless communication with a mobile device held by a user needs to be connected to a control unit that controls the entire elevator, and to easily support existing elevator systems that do not need to be connected to a control unit that controls the entire elevator, and to reduce installation work and The purpose is to provide an elevator control system and an elevator control program that reduces elevator downtime and costs due to maintenance work, repair work and replacement work in case of failure.

[Summary]

[0009]

The present invention consists of the means described below in 1) and 2) to solve the above problems.

In other words:

1) In an aspect, the present disclosure refers to an elevator control system comprising:

- a user's mobile device,
- a landing area radio device installed at each floor of an elevator, and
- an elevator car radio device installed in each elevator car,

wherein
the user's mobile device comprises:

- a BLE communication unit that receives radio signals and building data in a predetermined frequency band transmitted from a landing area radio device, and radio signals, building data, and floor data in a predetermined frequency band transmitted from a landing area radio device,
- a device that creates command data for destination direction, destination floor, etc. based on received radio signals, building data, and floor data; and
- a pattern storage unit that stores patterned data such as destination direction, destination floor, etc., in advance,
- a BLE UART communication unit that transmits the created command data to the landing area radio device and the elevator car radio device,
- a memory that records radio signals, building data, and floor data received from the landing area radio device and the elevator car radio device; and

the landing area radio device comprises:

- a BLE communication unit that transmits radio signals in a predetermined frequency band and building data to the user's mobile device in the landing area,
- a BLE UART communication unit that receives command data sent from the user's mobile device in the landing area, and
- a pattern storage unit that stores patterned data such as destination direction, etc., in advance,

the device determines whether the received command data matches the patterned data stored in the pattern storage unit,

- a general-purpose IO port section that drives a relay that operates the switches on the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and

the elevator car radio device comprises:

- a BLE communication unit that transmits radio signals in a predetermined frequency band, building data, and floor data to the user's mobile device in the elevator car,
- a BLE UART communication unit that receives command data sent from the user's mobile device in the elevator car,
- a pattern storage unit where patterned data such as destination floors, etc. are stored in advance,

the device determines whether the received command data matches the patterned data stored in the pattern storage unit,

- a general-purpose IO port section and a SPI IO port section that drive relays that operate the switches of the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and

wherein
the user's mobile device is configured to,
based on building data received from the landing area radio device, and
building data and floor data received from the elevator car control panel radio equipment,
transmit user-created command data, such as destination direction, destination floor, etc., to the landing area radio device and the elevator car radio device;
the general-purpose IO port section of the landing area radio device is configured to,
based on the command data received from the user's mobile device, such as the destination direction, etc.,
drive the relays that operate the switches on the landing area control panel,
such that the elevator car ascends and descends to the floor where the user is located; and
the general-purpose IO port section and the SPI IO port section of the elevator car radio device is configured to,

based on the command data received from the user's mobile device, such as the destination floor, etc.,

drive the relays that operate the switches on the elevator car control panel, such that the elevator car ascends or descends to the floor that the user designates as the destination floor,

allowing the user to operate the control panel at the landing area and in the elevator car without having to operate the respective control panel,

and allowing elevator car transition to the desired floor.

In an example, the user's mobile device and

a landing area radio device installed at each floor of the elevator and

an elevator car radio device installed in each elevator car and

and

the user's mobile device is

a BLE communication unit that receives radio signals and building data in a predetermined frequency band transmitted from a landing area radio device, and radio signals, building data, and floor data in a predetermined frequency band transmitted from a landing area radio device,

a device that creates command data for destination direction, destination floor, etc. based on received radio signals, building data, and floor data; and

a pattern storage unit that stores patterned data such as destination direction, destination floor, etc., in advance,

a BLE UART communication unit that transmits the created command data to the landing area radio device and the elevator car radio device,

a memory that records radio signals, building data, and floor data received from the landing area radio device and the elevator car radio device; and

consisting of

the landing area radio device is

a BLE communication unit that transmits radio signals in a predetermined frequency band and building data to the user's mobile device in the landing area,

a BLE UART communication unit that receives command data sent from the user's mobile device in the landing area, and

a pattern storage unit that stores patterned data such as destination direction, etc., in advance,

the device determines whether the received command data matches the patterned data stored in the pattern storage unit,

a general-purpose IO port section that drives a relay that operates the switches on the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and

consisting of

the elevator car radio device is

a BLE communication unit that transmits radio signals in a predetermined frequency band, building data, and floor data to the user's mobile device in the elevator car,

a BLE UART communication unit that receives command data sent from the user's mobile device in the elevator car,

a pattern storage unit where patterned data such as destination floors, etc. are stored in advance,

the device determines whether the received command data matches the patterned data stored in the pattern storage unit,

a general-purpose IO port section and a SPI IO port section that drive relays that operate the switches of the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and

consisting of

the user's mobile device is

building data to be received from the landing area radio device, and

building data, and floor data to be received from the elevator car control panel radio equipment,

based on

the user-created command data, such as destination direction, destination floor, etc., can be transmitted to the landing area radio device and the elevator car radio device, and

the landing area radio device is

based on the command data received from the user's mobile device, such as the destination direction, etc.,

the general-purpose IO port section drives the relays that operate the switches on the landing area control panel,

the elevator car ascends and descends to the floor where the user is located,

the elevator car radio system was

based on the command data received from the user's mobile device, such as the destination floor, etc.,

the general-purpose IO port section and the SPI IO port section drive the relays that operate the switches on the elevator car control panel,

the elevator car ascends or descends to the floor that the user designates as the destination floor,

this allows the user to operate the control panel at the landing area and in the elevator car without having to operate the respective control panel,

elevator car transition to the desired floor of

an elevator control system characterized by the following features.

2) In an aspect, the present disclosure refers to an elevator control program implemented by the elevator control system as defined in the above aspect for enabling:

the user's mobile device to,

based on building data received from the landing area radio device, and

building data and floor data received from the elevator car control panel radio equipment,

transmit the user-created command data, such as destination direction, destination floor, etc., to the landing area radio device and the elevator car radio device;

the general-purpose IO port section of the landing area radio device to,

based on the command data received from the user's mobile device, such as the destination direction, etc.,

drive the relays that operate the switches on the landing area control panel,

such that the elevator car ascends and descends to the floor where the user is located; and

the general-purpose IO port section and the SPI IO port section of the elevator car radio device to,

based on the command data received from the user's mobile device, such as the destination floor, etc.,

drive the relays that operate the switches on the elevator car control panel,

such that the elevator car ascends or descends to the floor that the user designates as the destination floor,

allowing the user to operate the control panel at the landing area and in the elevator car without having to operate the respective control panel,

and allowing elevator car transition to the desired floor.

In an example, the user's mobile device is then

a BLE communication unit that receives radio signals and building data in a predetermined frequency band transmitted from a landing area radio device, and radio signals, building data, and floor data in a predetermined frequency band transmitted from a landing area radio device,

a device that creates command data for destination direction, destination floor, etc. based on received radio signals, building data, and floor data; and

a pattern storage unit that stores patterned data such as destination direction, destination floor, etc., in advance,

a BLE UART communication unit that transmits the created command data to the landing area radio device and the elevator car radio device,

a memory that records radio signals, building data, and floor data received from the landing area radio device and the elevator car radio device; and

the landing area radio device is designed to
a BLE communication unit that transmits radio signals in a predetermined frequency band and building data to the user's mobile device in the landing area,
a BLE UART communication unit that receives command data sent from the user's mobile device in the landing area, and
a pattern storage unit that stores patterned data such as destination direction, etc., in advance,
the device determines whether the received command data matches the patterned data stored in the pattern storage unit,
a general-purpose IO port section that drives a relay that operates the switches on the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and
the elevator car radio system is designed to
a BLE communication unit that transmits radio signals in a predetermined frequency band, building data, and floor data to the user's mobile device in the elevator car,
a BLE UART communication unit that receives command data sent from the user's mobile device in the elevator car,
a pattern storage unit where patterned data such as destination floors, etc. are stored in advance,
the device determines whether the received command data matches the patterned data stored in the pattern storage unit,
a general-purpose IO port section and a SPI IO port section that drive relays that operate the switches of the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and
the function of the system is to
the user's mobile device is
building data to be received from the landing area radio device, and
building data, and floor data to be received from the elevator car control panel radio equipment,
based on
the user-created command data, such as destination direction, destination floor, etc., can be transmit to the landing area radio device and the elevator car radio device, and

Claims

[Claim 1]
An elevator control system comprising:
- a user's mobile device,
- a landing area radio device installed at each floor of an elevator, and
- an elevator car radio device installed in each elevator car,

wherein
the user's mobile device comprises:
- a BLE communication unit that receives radio signals and building data in a predetermined frequency band transmitted from a landing area radio device, and radio signals, building data, and floor data in a predetermined frequency band transmitted from a landing area radio device,
- a device that creates command data for destination direction, destination floor, etc. based on received radio signals, building data, and floor data; and
- a pattern storage unit that stores patterned data such as destination direction, destination floor, etc., in advance,
- a BLE UART communication unit that transmits the created command data to the landing area radio device and the elevator car radio device,
- a memory that records radio signals, building data, and floor data received from the landing area radio device and the elevator car radio device; and

the landing area radio device comprises:
- a BLE communication unit that transmits radio signals in a predetermined frequency band and building data to the user's mobile device in the landing area,
- a BLE UART communication unit that receives command data sent from the user's mobile device in the landing area, and
- a pattern storage unit that stores patterned data such as destination direction, etc., in advance,

the device determines whether the received command data matches the patterned data stored in the pattern storage unit,
- a general-purpose IO port section that drives a relay that operates the switches on the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and

the elevator car radio device comprises:
- a BLE communication unit that transmits radio signals in a predetermined frequency band, building data, and floor data to the user's mobile device in the elevator car,
- a BLE UART communication unit that receives command data sent from the user's mobile device in the elevator car,
- a pattern storage unit where patterned data such as destination floors, etc. are stored in advance,

the device determines whether the received command data matches the patterned data stored in the pattern storage unit,
- a general-purpose IO port section and SPI IO port section that drive relays that operate the switches of the landing area control panel when the received command data matches the patterned data stored in the pattern storage section, and

wherein
the user's mobile device is configured to,
based on building data received from the landing area radio device, and
building data and floor data received from the elevator car control panel radio equipment,
transmit user-created command data, such as destination direction, destination floor, etc., to the landing area radio device and the elevator car radio device;
the general-purpose IO port section of the landing area radio device is configured to,

based on the command data received from the user's mobile device, such as the destination direction, etc.,

drive the relays that operate the switches on the landing area control panel,

such that the elevator car ascends and descends to the floor where the user is located; and

the general-purpose IO port section and the SPI IO port section of the elevator car radio device is configured to,

based on the command data received from the user's mobile device, such as the destination floor, etc.,

drive the relays that operate the switches on the elevator car control panel,

such that the elevator car ascends or descends to the floor that the user designates as the destination floor,

allowing the user to operate the control panel at the landing area and in the elevator car without having to operate the respective control panel,

and allowing elevator car transition to the desired floor.

[Claim 2]

An elevator control program implemented by the elevator control system as defined in claim 1 for enabling:

the user's mobile device to,

based on building data received from the landing area radio device, and

building data and floor data received from the elevator car control panel radio equipment,

transmit the user-created command data, such as destination direction, destination floor, etc., to the landing area radio device and the elevator car radio device;

the general-purpose IO port section of the landing area radio device to,

based on the command data received from the user's mobile device, such as the destination direction, etc.,

drive the relays that operate the switches on the landing area control panel,

such that the elevator car ascends and descends to the floor where the user is located; and

the general-purpose IO port section and the SPI IO port section of the elevator car radio device to,

based on the command data received from the user's mobile device, such as the destination floor, etc.,

drive the relays that operate the switches on the elevator car control panel,

such that the elevator car ascends or descends to the floor that the user designates as the destination floor,

allowing the user to operate the control panel at the landing area and in the elevator car without having to operate the respective control panel,

and allowing elevator car transition to the desired floor.