[Summary of Invention]

[Technical Problem]

[0005]

However, the conventional method is limited to a case in which a device to which the method is applied has three color light sources such as an illuminator. ~~The~~Embodiments of the present invention ~~solves this problem, and~~ provide~~s~~ an information communication method that enable~~s~~ communication between various devices including a device with low computational performance.

[Solution to Problem]

[0006]

~~An information communication method according to an aspect of the present invention is an information communication method of transmitting a signal using a change in luminance, the information communication method including: determining a pattern of the change in luminance, by modulating a first signal to be transmitted; transmitting the first signal, by all of a plurality of light emitting elements included in a light emitter changing in luminance in a same manner according to the determined pattern of the change in luminance; and transmitting a second signal to be transmitted, by each of the plurality of light emitting elements emitting light with one of two different luminance values so that a light and dark sequence of luminance appears in a space where the light emitter is placed.~~

According to a first aspect of the present invention, there is provided an information communication method of transmitting a signal using a change in luminance, the information communication method comprising: determining a pattern of the change in luminance, by modulating a signal to be transmitted; and transmitting the signal by a display, which is a light emitter, changing in luminance according to the determined pattern, wherein in the transmitting of the signal, when the display is adjacent to an other display and each of the display and the other display transmits a signal by changing in luminance, the display changes in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the

non-transmission area.

[0006a]

According to a second aspect of the present invention, there is provided an information communication device that transmits a signal using a change in luminance, the information communication device comprising: a determination unit configured to determine a pattern of the change in luminance, by modulating a signal to be transmitted; and a transmission unit configured to transmit the signal by causing a display, which is a light emitter, to change in luminance according to the determined pattern, wherein when the display is adjacent to an other display and the transmission unit transmits a signal by causing each of the display and the other display to change in luminance, the transmission unit is configured to cause the display to change in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the non-transmission area.

[0006b]

According to a third aspect of the present invention, there is provided a program for controlling an information communication device that transmits a signal using a change in luminance, the program causing a computer included in the information communication device to execute: determining a pattern of the change in luminance, by modulating a signal to be transmitted; and transmitting the signal by a display, which is a light emitter, changing in luminance according to the determined pattern, wherein in the transmitting of the signal, when the display is adjacent to an other display and each of the display and the other display transmits a signal by changing in luminance, the display changes in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the non-transmission area.

[0007]

These general and specific aspects may be implemented using a system, a method, an integrated circuit, a computer program, or a computer-readable recording medium such as a CD-ROM, or any

combination of systems, methods, integrated circuits, computer programs, or computer-readable recording media.

[Advantageous Effects of Invention]

[0008]

An information communication method as per embodiments disclosed herein enables communication between various devices including a device with low computational performance.

[Brief Description of Drawings]

[CLAIMS]

[Claim 1]

An information communication method of transmitting a signal using a change in luminance, the information communication method comprising:

determining a pattern of the change in luminance, by modulating a first signal to be transmitted;

transmitting the first signal, by all of a plurality of light emitting elements included in a light emitter changing in luminance in a same manner according to the determined pattern of the change in luminance; and

transmitting a second signal to be transmitted, by each of the plurality of light emitting elements emitting light with one of two different luminance values so that a light and dark sequence of luminance appears in a space where the light emitter is placed.

[Claim 2]

The information communication method according to Claim 1,

wherein in the transmitting of a second signal, a first sequence pattern and a second sequence pattern alternately appear in the space, the first sequence pattern being a pattern of the light and dark sequence of luminance and appearing for 0.2 millisecond or less, and the second sequence pattern being a pattern opposite in phase to the first sequence pattern and appearing for 0.2 second or less.

[Claim 3]

The information communication method according to Claim 1 or 2,

wherein in the transmitting of a second signal, a sequence of a plurality of colors that are in a complementary color relationship appears instead of the light and dark sequence of luminance.

[Claim 4]

The information communication method according to any one of Claims 1 to 3,

wherein the light emitter is a lighting device including the plurality of light emitting elements that are arranged along one direction, and

a width of the light emitter in the direction is greater than a width of the light emitter in a direction perpendicular to the direction.

[Claim 5]

The information communication method according to Claim 1,

wherein in the transmitting of the first signal, when the light emitter transmits the signal by changing in luminance together with an other light emitter, a normal light emitter positioned between the light emitter and the other light emitter emits light without changing in luminance.

[Claim 6]

The information communication method according to Claim 1,

wherein in the transmitting of the first signal, when a display which is the light emitter is adjacent to an other display and each of the display and the other display transmits a signal by changing in luminance, the display changes in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the non-transmission area.

[Claim 7]

The information communication method according to Claim 1, further comprising:

setting an exposure time of an image sensor so that, in an image obtained by capturing the light emitter by the image sensor, a bright line corresponding to an exposure line included in the image sensor appears according to the change in luminance of the light emitter;

obtaining a bright line image including the bright line by capturing, by the image sensor with the set exposure time, the light emitter in which the plurality of light emitting elements all change in luminance in the same manner according to the pattern of the change

in luminance for indicating first information;

obtaining the first information by demodulating data specified by a pattern of the bright line included in the obtained bright line image; and

obtaining second information, by capturing the plurality of light emitting elements each of which emits light with one of the two different luminance values and demodulating data specified by the light and dark sequence of luminance along a direction parallel to the exposure line, the light and dark sequence being shown in an image obtained by capturing the plurality of light emitting elements.

[Claim 8]

An information communication device that transmits a signal using a change in luminance, the information communication device comprising:

a determination unit configured to determine a pattern of the change in luminance, by modulating a first signal to be transmitted;

a first transmission unit configured to transmit the first signal, by causing all of a plurality of light emitting elements included in a light emitter to change in luminance in a same manner according to the determined pattern of the change in luminance; and

a second transmission unit configured to transmit a second signal to be transmitted, by causing each of the plurality of light emitting elements to emit light with one of two different luminance values so that a light and dark sequence of luminance appears in a space where the light emitter is placed.

[CLAIMS]

[Claim 1]

An information communication method of transmitting a signal using a change in luminance, the information communication method comprising:

determining a pattern of the change in luminance, by modulating a signal to be transmitted; and

transmitting the signal by a display, which is a light emitter, changing in luminance according to the determined pattern,

wherein in the transmitting of the signal, when the display is adjacent to an other display and each of the display and the other display transmits a signal by changing in luminance, the display changes in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the non-transmission area.

[Claim 2]

The information communication method according to Claim 1, further comprising

transmitting a same signal as the signal by the display changing in luminance according to a same pattern as the determined pattern within 33 milliseconds from the transmission of the signal,

wherein in the determining of a pattern, the pattern is determined so that each average obtained by moving-averaging the changing luminance with a width greater than or equal to 5 milliseconds is within a predetermined range.

[Claim 3]

The information communication method according to Claim 1 or 2,

wherein in the determining of a pattern, the pattern of the change in luminance is determined by adjusting a time from one change to a next change in luminance according to the signal, the one change and the next change being a same one of a rise and a fall in luminance.

[Claim 4]

The information communication method according to any one of Claims 1 to 3,

wherein in the transmitting of the signal, the signal is transmitted by a light emitting element changing in luminance, the light emitting element being included in the display.

[Claim 5]

An information communication device that transmits a signal using a change in luminance, the information communication device comprising:

a determination unit configured to determine a pattern of the change in luminance, by modulating a signal to be transmitted; and

a transmission unit configured to transmit the signal by causing a display, which is a light emitter, to change in luminance according to the determined pattern,

wherein when the display is adjacent to an other display and the transmission unit transmits a signal by causing each of the display and the other display to change in luminance, the transmission unit is configured to cause the display to change in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the non-transmission area.

[Claim 6]

A program for controlling an information communication device that transmits a signal using a change in luminance, the program causing a computer included in the information communication device to execute:

determining a pattern of the change in luminance, by modulating a signal to be transmitted; and

transmitting the signal by a display, which is a light emitter, changing in luminance according to the determined pattern,

wherein in the transmitting of the signal, when the display is adjacent to an other display and each of the display and the other display transmits a signal by changing in luminance, the display changes in luminance in an area of the display other than a non-transmission area that is near the other display, without changing in luminance in the non-transmission area.