[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 seek to solve~~s~~ this problem, and provide~~s~~ an information communication method that enables 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 the signal to be transmitted; and transmitting the signal, by a plurality of light emitters changing in luminance according to the determined pattern of the change in luminance, wherein ~~the plurality of light emitters are arranged on a surface so that a non-luminance change area does not extend across the surface between the plurality of light emitters along at least one of a horizontal direction and a vertical direction of the surface, the non-luminance change area being an area in the surface outside the plurality of light emitters and not changing in luminance.~~ in the determining, a first luminance change pattern corresponding to a body which is a part of the signal, a second luminance change pattern indicating a header for specifying the body, and a third luminance change pattern indicating an other header different from the header are determined, and in the transmitting, the header, the body, and the other header are transmitted by the plurality of light emitters

changing in luminance according to the first luminance change pattern, the second luminance change pattern, the first luminance change pattern, and the third luminance change pattern in the stated order.

[0006a]

According to another 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 the signal to be transmitted; and a transmission unit configured to transmit the signal, by changing a plurality of light emitters in luminance according to the determined pattern of the change in luminance, wherein the determination unit is configured to determine a first luminance change pattern corresponding to a body which is a part of the signal, a second luminance change pattern indicating a header for specifying the body, and a third luminance change pattern indicating an other header different from the header, and the transmission unit is configured to transmit the header, the body, and the other header by changing the plurality of light emitters in luminance according to the first luminance change pattern, the second luminance change pattern, the first luminance change pattern, and the third luminance change pattern in the stated order.

[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 according to embodiments of the present invention may 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 the signal to be transmitted; and

transmitting the signal, by a plurality of light emitters changing in luminance according to the determined pattern of the change in luminance,

wherein in the determining, a first luminance change pattern corresponding to a body which is a part of the signal, a second luminance change pattern indicating a header for specifying the body, and a third luminance change pattern indicating an other header different from the header are determined, and

in the transmitting, the header, the body, and the other header are transmitted by the plurality of light emitters changing in luminance according to the first luminance change pattern, the second luminance change pattern, the first luminance change pattern, and the third luminance change pattern in the stated order.

[Claim 2]

The information communication method according to Claim 1,

wherein the plurality of light emitters are arranged on a surface so that a non-luminance change area does not extend across the surface between the plurality of light emitters along at least one of a horizontal direction and a vertical direction of the surface, the non-luminance change area being an area in the surface outside the plurality of light emitters and not changing in luminance.

[Claim 3]

The information communication method according to Claim 1 or Claim 2,

wherein the transmitting includes

determining whether or not a level of brightness of at least one light emitter of the plurality of light emitters is less than or equal to a reference level which is predetermined brightness, and

in the transmitting, the transmission of the signal from the at least one light emitter is stopped in the case of determining that the level of brightness of the at least one light emitter is less than or equal to the reference level.

[Claim 4]

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

wherein the transmitting includes

determining whether or not a level of brightness of at least one light emitter of the plurality of light emitters is greater than or equal to a reference level which is predetermined brightness, and

in the transmitting, the transmission of the signal from the at least one light emitter is started in the case of determining that the level of brightness of the at least one light emitter is greater than or equal to the reference level.

[Claim 5]

The information communication method according to one of Claims 1 to 4,

wherein in the determining:

luminance change patterns between which a timing at which a predetermined luminance value occurs is different are assigned to different signal units beforehand, to prevent two luminance change patterns from being assigned to signal units of a same parity, the timing at which the predetermined luminance value occurs in one of the two luminance change

patterns being adjacent to the timing at which the predetermined luminance value occurs in the other one of the two luminance change patterns; and

for each signal unit included in the signal, a luminance change pattern assigned to the signal unit is determined.

[Claim 6]

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 at least one light emitter of the plurality of light emitters by the image sensor, bright lines corresponding to exposure lines included in the image sensor appear according to the change in luminance of the at least one light emitter;

obtaining a bright line image including the bright lines, by capturing the at least one light emitter changing in luminance by the image sensor with the set exposure time; and

obtaining information by demodulating data specified by a pattern of the bright lines included in the obtained bright line image,

wherein the obtaining of information includes:

specifying, in the pattern of the bright lines, a second part and a third part between which a first part corresponding to the second luminance change pattern is interposed in a direction perpendicular to the bright lines; and

obtaining the body by demodulating data specified by the second part and the third part, and

in the specifying, the second part and the third part are specified so that a sum of a length of the second part and a length of the third part in the direction perpendicular to the bright lines is a length associated with the body.

[Claim 7]

The information communication method according to one

of Claims 1 to 6, further comprising

determining whether or not a flash emitted in a predetermined rhythm is received,

wherein in the transmitting, the plurality of light emitters change in higher luminance, in the case of determining that the flash is received.

[Claim 8]

The information communication method according to one of Claims 1 to 7, further comprising

at least one light emitter of the plurality of light emitters blinking to be visible to a human eye,

wherein the at least one light emitter repeatedly alternates between the transmitting and the blinking.

[Claim 9]

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 the signal to be transmitted; and

a transmission unit configured to transmit the signal, by changing a plurality of light emitters in luminance according to the determined pattern of the change in luminance,

wherein the determination unit is configured to determine a first luminance change pattern corresponding to a body which is a part of the signal, a second luminance change pattern indicating a header for specifying the body, and a third luminance change pattern indicating an other header different from the header, and

the transmission unit is configured to transmit the header, the body, and the other header by changing the plurality of light emitters in luminance according to the first luminance change pattern, the second luminance change pattern, the first

luminance change pattern, and the third luminance change pattern in the stated order.