

[DESCRIPTION]

[Title of Invention] SPACE PROPOSAL SYSTEM AND SPACE PROPOSAL METHOD

[Technical Field]

5 [0001]

The present invention relates to a space proposal system and a space proposal method.

[Background Art]

[0002]

10 Techniques relating to evaluations of buildings such as a home have been conventionally proposed. Patent Literature (PTL) 1 discloses a housing analytic diagnosis system that analyzes, according to a predetermined standard, measured data obtained by conducting a diagnosis of housing equipment and the like to classify
15 the measured data into a plurality of stages, to arrange classified contents into a predetermined format, and to output the result.

[Citation List]

[Patent Literature]

[0003]

20 [PTL 1] Japanese Unexamined Patent Application Publication No. 2002-317560

[Summary of Invention]

[Technical Problem]

[0004]

25 The present invention provides a space proposal system and a space proposal method which are capable of aiding in designing a space that meets a predetermined criterion.

[Solution to Problem]

[0005]

30 A space proposal system according to an aspect of the present invention includes: a first obtainer that obtains space design data indicating a state of a design space; a calculator that calculates a spatial distribution of environmental information in the design space, based on the space design data; and a determiner that determines,
35 based on the spatial distribution calculated, whether an environment

in the design space satisfies a determination criterion used for environmental certification for a physical space.

[0006]

A space proposal method according to an aspect of the present invention includes: obtaining space design data indicating a state of a design space; calculating a spatial distribution of environmental information in the design space, based on the space design data; and determining, based on the spatial distribution calculated, whether an environment in the design space satisfies a determination criterion used for environmental certification for a physical space.

[Advantageous Effects of Invention]

[0007]

A space proposal system and a space proposal method according to an aspect of the present invention are capable of aiding in designing a space that meets a predetermined criterion.

[Brief Description of Drawings]

[0008]

[FIG. 1]

FIG. 1 is a block diagram illustrating a functional configuration of a space proposal system according to Embodiment 1.

[FIG. 2]

FIG. 2 is a flowchart illustrating operation performed by the space proposal system according to Embodiment 1.

[FIG. 3]

FIG. 3 is a diagram illustrating an example of a display screen showing that an environment in a design space satisfies a determination criterion for an evaluation point of the WELL certification.

[FIG. 4]

FIG. 4 is a diagram illustrating an example of a display screen showing a proposal to change a position of an air conditioner.

[FIG. 5]

FIG. 5 is a diagram illustrating an example of a display screen showing advices on a design change.

[FIG. 6]

FIG. 6 is a block diagram illustrating a functional configuration of a space proposal system according to Embodiment 2.

[FIG. 7]

FIG. 7 is a flowchart illustrating operation performed by the space proposal system according to Embodiment 2.

[FIG. 8]

FIG. 8 is a diagram illustrating an example of a display screen showing control parameters.

[Description of Embodiments]

10 [0009]

Hereinafter, embodiments will be described in detail with reference to the drawings. Note that the embodiments below each describe a general or specific example. The numerical values, shapes, materials, elements, the arrangement and connection of the elements, steps, and the order of the steps, etc. described in the following embodiments are mere examples, and thus are not intended to limit the present invention. Furthermore, among the elements in the following embodiments, those not recited in any of the independent claims are described as optional elements.

20 [0010]

Note that the drawings are schematic diagrams and do not necessarily provide strictly accurate illustrations. Throughout the drawings, the same signs are given to substantially the same elements, and redundant description is omitted or simplified.

25 [0011]

[Embodiment 1]

[Configuration]

First, a configuration of a space proposal system according to Embodiment 1 will be described. FIG. 1 is a block diagram illustrating a functional configuration of the space proposal system according to Embodiment 1.

[0012]

Space proposal system 100 according to Embodiment 1 determines whether a design space satisfies determination criteria for evaluation points of the WELL Building Standard (registered trade

mark; hereinafter, referred to as the WELL certification). The WELL certification is a certification program aiming to create a better living environment by further adopting a point of view on human health, in addition to a physical environment, such as a temperature, humidity, and air quality, when designing a space. Evaluation points of the WELL certification include, for example, points relating to air, points relating to light, and points relating to comfort. Space proposal system 100 includes database 10, server device 20, and information terminal 30. Server device 20 includes space design data generator 21, first obtainer 22, calculator 23, determiner 24, and presenter 25. Each of these elements is implemented by a microcomputer or a processor included in server device 20.

[0013]

[Operation]

Next, operation performed by space proposal system 100 will be described. FIG. 2 is a flowchart illustrating operation performed by space proposal system 100.

[0014]

Space design data generator 21 generates space design data indicating a state of a design space, based on building information modeling (BIM) data 11 and device data 12 which are provided by database 10 (S11). A server device different from server device 20 includes database 10, for example, but server device 20 may include database 10.

[0015]

BIM data 11 indicates a shape and dimensions (i.e., a floor plan) of a building that creates a space. To be more specific, BIM data 11 is, for example, three-dimensional computer-aided design (CAD) data. BIM data 11 includes a plurality of types of data relating to a building, such as data about components (materials) used for constructing the building. In addition, BIM data 11 may include data that enables simulations of an indoor environment in the building under various conditions or simulations of an outdoor environment outside the building under various conditions to be carried out.

[0016]

Device data 12 indicates specifications and the like of a device to be provided in a space. The specifications of a device include, for example, a model, a shape, a size, the maximum output, and a power supply specification of the device. A device here means a device that controls an environment in a space. Specifically, a device may be an air conditioner that controls the temperature and humidity in a space, a ventilation device that controls an airflow in a space, an air purifier that controls the concentration of particulate matter in a space, a lighting device that controls the brightness (lighting environment) in a space, etc.

[0017]

Space design data generator 21 generates, as space design data, a three-dimensional model of a design space by positioning, in a building defined by BIM data 11, a device indicated by device data 12, for example. Space design data generator 21 generates the space design data based on an operation performed by a designer via a user interface device or the like included in information terminal 30, for example.

[0018]

Next, first obtainer 22 obtains the space design data (S12). Note that it is not essential that server device 20 generates the space design data. First obtainer 22 may directly obtain space design data from a server device different from server device 20.

[0019]

Next, calculator 23 calculates, based on the space design data obtained by first obtainer 22, a first spatial distribution (i.e., a three-dimensional distribution) of environmental information in the design space (S13). Calculator 23 can calculate the spatial distribution using an existing analytical algorithm. An analytical algorithm used for the calculation of the spatial distribution is not particularly limited.

[0020]

Calculator 23 calculates the spatial distribution of predicted mean vote (PMV) in the design space, for example. PMV is an

indicator showing comfort of a space, and is environmental information indicating an environment in the space. PMV is an indicator that can be calculated using a temperature, a radiation temperature, humidity, an airflow (air speed), and the like. Note that although the calculation of PMV requires the amount of clothing worn by a person and the amount of work carried out by the person in a room, an average value or a limit value may be used as the value of the amount of clothing worn by the person and the value of the amount of work carried out by the person, for example.

10 [0021]

Note that calculator 23 may calculate the spatial distribution of environmental information other than PMV. Items of environmental information other than PMV are exemplified by a temperature, humidity, an airflow (air speed), a CO₂ concentration, a particulate matter (PM2.5, PM10, etc.) concentration, a volatile organic compounds (VOC) concentration, and the like. That is to say, calculator 23 may calculate the spatial distribution of these items of environmental information.

[0022]

20 Moreover, an initial value of environmental information on an outside (i.e., outdoor) of a space, an initial value of environmental information on an inside (i.e., indoor) of the space, a control parameter of a device (an operation state of a device) etc. are provided as analysis conditions for the calculation of the spatial distribution. The analysis conditions are provided by an operation performed by a designer via a user interface device or the like included in information terminal 30, for example. Here, the spatial distribution is calculated on the assumption that a device, such as an air conditioner, is in operation, but may be calculated on the assumption that a device is not in operation.

30 [0023]

Next, determiner 24 determines, based on the spatial distribution calculated by calculator 23, whether an environment in the design space satisfies a determination criterion for an evaluation point of the WELL certification (S14). A determination criterion for

an evaluation point of the WELL certification is, in other words, a determination criterion used for environmental certification for a physical space. For example, it is one of determination criteria in "comfort", which is an evaluation point of the WELL certification, that a value of PMV is to be within a range of ± 0.5 in at least 95% of an area in a space. Accordingly, determiner 24 determines whether the spatial distribution of PMV which is calculated by calculator 23 satisfies the determination criterion.

[0024]

When determiner 24 determines that the environment in the design space satisfies the determination criterion for the evaluation point of the WELL certification (Yes in S14), presenter 25 presents the satisfaction of the determination criterion (S15). Specifically, presenter 25 outputs information indicating that the environment in the design space satisfies the determination criterion for the evaluation point of the WELL certification. The outputted determination result information is transferred to information terminal 30 via, for example, a wide area network such as the Internet, and information terminal 30 displays the determination result on the display screen. FIG. 3 is a diagram illustrating an example of a display screen showing that an environment in a design space satisfies a determination criterion for an evaluation point of the WELL certification.

[0025]

Alternatively, when determiner 24 determines that the environment in the design space fails to satisfy the determination criterion for the evaluation point of WELL certification (No in S14), calculator 23 and determiner 24 optimize the design space within a predetermined allowable range of a design change (S16). In the optimization, calculator 23 and determiner 24 attempt to optimize the design by making a change in a design parameter, and then by repeatedly (i) calculating the spatial distribution of the environmental information in the design space after a change in a parameter is made and (ii) determining whether the calculated spatial distribution satisfies the determination criterion. The design

parameter is, for example, a position of an air conditioner. Calculator 23 and determiner 24 optimize the position of the air conditioner, for example. The design parameter is not particularly limited. Moreover, such optimization method is an example; any
5 existing algorithm may be used for the optimization.

[0026]

Thereafter, determiner 24 determines whether the environment in the optimized design space satisfies the determination criterion for the evaluation point of the WELL
10 certification (S17). When determiner 24 determines that the environment in the optimized design space satisfies the determination criterion for the evaluation point of the WELL certification (Yes in S17), presenter 25 presents an optimal solution for the design (S18). Specifically, presenter 25 outputs first
15 presentation information indicating an optimal position of the air conditioner. The outputted first presentation information is transferred to information terminal 30 via, for example, a wide area network, and information terminal 30 displays, based on the first presentation information, a proposal to change the position of the air
20 conditioner on the display screen. FIG. 4 is a diagram illustrating an example of a display screen showing a proposal to change the position of an air conditioner. As described above, presenter 25 presents an optimal solution for a design change as a proposal to modify the space design data, for example.

25 [0027]

Alternatively, when determiner 24 determines that the environment in the optimized design space fails to satisfy the determination criterion for the evaluation point of the WELL
certification (No in S17), presenter 25 presents a guideline for a
30 design change (S19). In other words, presenter 25 presents a fact that a change within the predetermined allowable range is unable to satisfy the determination criterion.

[0028]

Specifically, presenter 25 outputs second presentation
35 information indicating the need for replacing the current air

conditioner with another air conditioner or the need for adding an air conditioner. The outputted second presentation information is transferred to information terminal 30 via, for example, a wide area network, and information terminal 30 displays, based on the second presentation information, a proposal (advice) for replacement of the air conditioner and the like on the display screen. FIG. 5 is a diagram illustrating an example of a display screen showing advices on a design change. As described above, presenter 25 presents a guideline for a design change as a proposal to modify the space design data, for example.

[0029]

[Advantageous effects, etc.]

As has been described above, space proposal system 100 includes: first obtainer 22 that obtains space design data indicating a state of a design space; calculator 23 that calculates a spatial distribution of environmental information in the design space, based on the space design data; and determiner 24 that determines, based on the spatial distribution calculated, whether an environment in the design space satisfies a determination criterion used for environmental certification for a physical space.

[0030]

Space proposal system 100 as described above can aid in designing a space that meets a predetermined criterion (e.g., a criterion established for a physical space, such as a determination criterion used for environmental certification).

[0031]

In addition, for example, space proposal system 100 further includes presenter 25 that presents a proposal to modify the space design data, when determiner 24 determines that the environment in the design space fails to satisfy the determination criterion.

[0032]

Space proposal system 100 as described above can aid in designing a space that meets a predetermined criterion by presenting a proposal to modify space design data.

[0033]

In addition, for example, the space design data includes device data about a device which is provided in the design space for controlling the environment. Presenter 25 presents, as the proposal to modify the space design data, a change of a position of the device in the design space.

[0034]

Space proposal system 100 as described above can aid in designing a space that complies with environmental certification by presenting a proposal to change the position of a device.

[0035]

In addition, for example, the space design data includes device data about a device which is provided in the design space for controlling the environment. Presenter 25 presents, as the proposal to modify the space design data, replacement of the device in the design space by another device, or addition of a device to the design space.

[0036]

Space proposal system 100 as described above can aid in designing a space that complies with environmental certification by presenting replacement of a device or addition of a device.

[0037]

In addition, a space proposal method executed by a computer such as space proposal system 100 includes: obtaining space design data indicating a state of a design space; calculating a spatial distribution of environmental information in the design space, based on the space design data; and determining, based on the spatial distribution calculated, whether an environment in the design space satisfies a determination criterion used for environmental certification for a physical space.

[0038]

Such a space proposal method can aid in designing a space that meets a predetermined criterion.

[0039]

[Embodiment 2]

[Configuration]

Next, a configuration of a space proposal system according to Embodiment 2 will be described. FIG. 6 is a block diagram illustrating a functional configuration of the space proposal system according to Embodiment 2.

5 [0040]

Space proposal system 100a according to Embodiment 2 is a system that proposes a control method for controlling a device in a space (hereinafter, referred to as physical space 40) in a building which is actually created (constructed) based on conforming space
10 design data. Conforming space design data is space design data for a design space that is determined to satisfy a determination criterion for the WELL certification. Space proposal system 100a includes database 10, server device 20a, information terminal 30, and cause analysis database 50.

15 [0041]

Server device 20a includes space design data generator 21, first obtainer 22, calculator 23, determiner 24, second obtainer 26, and outputter 27. Each of these elements is implemented by a microcomputer or a processor included in server device 20a.

20 [0042]

FIG. 6 also illustrates a plurality of sensors 41, air conditioner 42, and control device 43 which are provided in physical space 40. Space proposal system 100a may further include these elements.

[0043]

25 The plurality of sensors 41 include a semiconductor gas sensor capable of sensing a gas concentration, a temperature sensor, a humidity sensor, an airflow sensor, an illuminance sensor, a human detection sensor, a microphone, a camera, etc. A gas concentration is, to be more specific, a CO₂ concentration, a particulate matter
30 concentration, a VOC concentration, or the like. The plurality of sensors 41 are provided in physical space 40, but at least one sensor is to be provided in physical space 40, for example. The plurality of sensors 41 are provided in mutually different positions in physical space 40. The plurality of sensors 41 may include a biological
35 sensor that senses biological information on a person in physical

space 40.

[0044]

Air conditioner 42 is an example of a device provided in physical space 40 for controlling an environment in physical space 40.

5 Although Embodiment 2 describes an example of proposing a control parameter of air conditioner 42, a device for controlling the environment in physical space 40 is not limited to air conditioner 42. Other than air conditioner 42, a ventilation device, an air purifier, a lighting device, or the like exemplifies a device for controlling the
10 environment in physical space 40.

[0045]

Control device 43 controls a device provided in physical space 40. In addition, control device 43 functions as a gateway device that transmits, to server device 20a, measurement values obtained
15 from the plurality of sensors 41. Control device 43 is, for example, an energy management system (EMS) controller having an energy management function. Control device 43 is not limited to the EMS controller; control device 43 may be a controller without an energy management function or may be a gateway device.

20 [0046]

[Operation]

Next, operation performed by space proposal system 100a will be described. FIG. 7 is a flowchart illustrating operation performed by space proposal system 100a.

25 [0047]

As has been described above, physical space 40 is a space created based on conforming space design data that is space design data for a design space determined to satisfy a determination criterion by determiner 24. Second obtainer 26 obtains a measured
30 value of environmental information in the above-described physical space 40 (S21). Specifically, second obtainer 26 obtains a measured value from each of the plurality of sensors 41 via control device 43. Second obtainer 26 also obtains an operation state (e.g., a set temperature and an air volume) of air conditioner 42 in physical
35 space 40.

[0048]

Second obtainer 26 may directly obtain a measured value of PMV (i.e., PMV calculated based on a measured temperature, measured humidity, a measured airflow, etc.) calculated by server
5 device 20a or an external device. The following steps will be described on the precondition that a measured value of PMV is obtained in step S21.

[0049]

Next, calculator 23 calculates a spatial distribution of
10 environmental information (to be more specific, PMV) in a design (i.e., in a simulation), based on the conforming space design data which has formed the basis for the creation of physical space 40 (S22). This spatial distribution is calculated based on analysis
15 conditions adjusted as much as possible to match the actual state (e.g., an operation state of a device) of the present physical space 40.

[0050]

Next, outputter 27 compares the measured value of PMV
20 obtained in step S21 and the spatial distribution of PMV calculated in step S22, and carries out a cause analysis of a difference between the measured value of PMV obtained in step S21 and a value of PMV in the design (hereinafter, also referred to as a design value of PMV) which corresponds to the measured value of PMV (S23). Specifically,
25 outputter 27 identifies the location (coordinates) at which PMV is measured in physical space 40, and carries out the cause analysis using, as the design value of PMV, the value of PMV at the identified location within the spatial distribution of PMV.

[0051]

This cause analysis is carried out by referring to the
30 preestablished cause analysis database 50, for example. A difference between the measured value of PMV and the design value of PMV is associated with a cause of the difference in cause analysis data 51 provided by cause analysis database 50. The
above-described cause analysis database 50 is empirically or
35 experimentally established in advance. In addition, cause analysis

database 50 is updated by an accumulation of data. Then, outputter 27 generates, based on a result of the cause analysis, a control parameter (e.g., a set temperature, an air volume, or an air direction) of air conditioner 42 for approximating the measured value of PMV to the design value (S24). Note that it is not essential to use cause analysis database 50.

[0052]

Calculator 23 recalculates the spatial distribution of PMV using the generated control parameter (S25), and determiner 24 determines whether the recalculated spatial distribution of PMV satisfies a determination criterion for an evaluation point of the WELL certification (S26). In other words, determiner 24 checks whether the control parameter generated in step S25 is created such that a design space satisfies the determination criterion for the evaluation point of the WELL certification (i.e., determiner 24 checks whether it is OK in a simulation). As has been described above, space proposal system 100a not merely determines whether a measured value of environmental information measured at a particular location in physical space 40 satisfies a determination criterion, but also determines whether a distribution of the environmental information in a design space (i.e., the entirety of a space) satisfies the determination criterion.

[0053]

When determiner 24 determines that the recalculated spatial distribution of PMV fails to satisfy the determination criterion for the evaluation point of the WELL certification (No in S26), outputter 27 does not output control information indicating the generated control parameter, and regenerates another control parameter (S24).

[0054]

Alternatively, when determiner 24 determines that the recalculated spatial distribution of PMV satisfies the determination criterion for the evaluation point of the WELL certification (Yes in S26), outputter 27 outputs control information indicating the generated control parameter (S27). The outputted control information is transmitted to information terminal 30 via, for

example, a wide area network, and information terminal 30 displays, based on the control information, the control parameter on the display screen. FIG. 8 is a diagram illustrating an example of a display screen showing control parameters.

5 [0055]

The outputted control information is also transmitted to control device 43 via, for example, a wide area network, and control device 43 controls air conditioner 42 using the control parameter indicated by the received control information (S28). Thereafter, a
10 repetition of processing performed from step S21 through step S28 approximates measured values of PMV to design values.

[0056]

[Advantageous effects, etc.]

As has been described above, space proposal system 100a
15 includes: first obtainer 22 that obtains space design data indicating a state of a design space; calculator 23 that calculates a first spatial distribution of environmental information in the design space, based on the space design data (the space design data includes device data about a device provided in the design space for controlling the
20 environment); determiner 24 that determines, based on the first spatial distribution calculated, whether an environment in the design space satisfies a determination criterion used for environmental certification for physical space 40; second obtainer 26 that obtains a measured value of the environmental information in physical space
25 40 created based on conforming space design data that is the space design data for the design space determined to satisfy the determination criterion by determiner 24; and outputter 27 that outputs control information indicating a control method for controlling the device provided in physical space 40 for
30 approximating the measured value of the environmental information which is obtained to a design value determined by the spatial distribution calculated based on the conforming space design data.

[0057]

Space proposal system 100a as described above can propose a
35 control method (e.g., a control parameter) for controlling a device for

approximating physical space 40 to a space that satisfies a determination criterion used for environmental certification.

[0058]

5 In addition, for example, outputter 27 outputs the control information to control device 43 that controls the device provided in physical space 40.

[0059]

10 Space proposal system 100a as described above can control a device for approximating physical space 40 to a space that satisfies a determination criterion used for environmental certification.

[0060]

15 In addition, for example, outputter 27 (i) generates the control information based on a difference between the measured value of the environmental information which is obtained and the design value, and (ii) outputs the control information, when the spatial distribution recalculated using the control information generated is determined to satisfy the determination criterion.

[0061]

20 Space proposal system 100a as described above can propose a control method whose capability of making, in a design, physical space 40 into a space that satisfies a determination criterion used for environmental certification has been demonstrated.

[0062]

[Other Embodiments]

25 The embodiments have been described hereinbefore, but the present invention is not limited to the above-described embodiments.

[0063]

30 For example, although whether an environment in a design space satisfies a determination criterion for an evaluation point of the WELL certification is determined in the above-described embodiments, a determination criterion is not limited to a determination criterion for an evaluation point of the WELL certification. A determination criterion may be a criterion based on
35 biological information on a person, such as a criterion for

approximating a space to an environment which can regulate the autonomic nervous system of a person, or a criterion for approximating a space to an environment which can improve their powers of concentration. An environment described in the description includes an environment determined based on biological information on a person.

[0064]

In addition, although each of the space proposal systems described in the above embodiment is implemented by a plurality of devices, each space proposal system may be implemented by a single device. When each space proposal system is implemented by a plurality of devices, elements included in the space proposal system may be assigned to the plurality of devices in any manner.

[0065]

Moreover, a communication method for communicating between devices in the above-described embodiments is not particularly limited, for example. A relay device, which is not illustrated, may be provided between the devices for communication.

[0066]

In addition, a process performed by a particular processor in the above-described embodiments may be performed by another processor. The orders of processes may be changed, and a plurality of processes may be performed in parallel.

[0067]

Furthermore, in the above-described embodiments, each element may be implemented by executing a software program suitable for the element. Each element may be implemented as a result of a program executor, such as a CPU or processor or the like, loading and executing a software program stored in a storage medium such as a hard disk or a semiconductor memory.

[0068]

In addition, each element may be implemented by a hardware product. For example, each element may be a circuit (or an integrated circuit). These circuits may configure a single circuit as a whole, or may be individual circuits. Each of these circuits may be a

general-purpose circuit or a dedicate circuit.

[0069]

These general and specific aspects of the present invention may be implemented using a system, a device, a method, an integrated circuit, a computer program, or a computer-readable recording medium such as a CD-ROM. Moreover, these general and specific aspects of the present invention may also be implemented by any optional combination of systems, devices, methods, integrated circuits, computer programs, and recording media.

[0070]

For example, the present invention may be implemented as a server device according to the above-described embodiments, or may be implemented as a space proposal system corresponding to the server device. In addition, the present invention may be implemented as a space proposal method executed by a computer, such as a space proposal system, or may be implemented as a program for causing a computer to execute such a space proposal method. The present invention may also be implemented as a non-transitory computer-readable recording medium on which such a program is recorded.

[0071]

The present invention also encompasses: embodiments achieved by applying various modifications conceivable to those skilled in the art to each embodiment; and embodiments achieved by optionally combining the elements and the functions of each embodiment without departing from the essence of the present invention.

[Reference Signs List]

[0072]

22	first obtainer
23	calculator
24	determiner
25	presenter
26	second obtainer
27	outputter

40 physical space
42 air conditioner (device)
43 control device
100, 100a space proposal system

5

[CLAIMS]

[Claim 1]

A space proposal system comprising:

5 a first obtainer that obtains space design data indicating a state of a design space;

a calculator that calculates a spatial distribution of environmental information in the design space, based on the space design data; and

10 a determiner that determines, based on the spatial distribution calculated, whether an environment in the design space satisfies a determination criterion used for environmental certification for a physical space.

[Claim 2]

15 The space proposal system according to claim 1, further comprising:

a presenter that presents a proposal to modify the space design data, when the determiner determines that the environment in the design space fails to satisfy the determination criterion.

20

[Claim 3]

The space proposal system according to claim 2, wherein

25 the space design data includes device data about a device which is provided in the design space for controlling the environment, and

the presenter presents, as the proposal to modify the space design data, a change of a position of the device in the design space.

[Claim 4]

30 The space proposal system according to claim 2, wherein

the space design data includes device data about a device which is provided in the design space for controlling the environment, and

35 the presenter presents, as the proposal to modify the space design data, replacement of the device in the design space by

another device, or addition of a device to the design space.

[Claim 5]

The space proposal system according to claim 1, wherein
5 the space design data includes device data about a device which is provided in the design space for controlling the environment, and

the space proposal system further comprises:

10 a second obtainer that obtains a measured value of the environmental information in a physical space created based on conforming space design data that is the space design data for the design space determined to satisfy the determination criterion by the determiner; and

15 an outputter that outputs control information indicating a control method for controlling the device provided in the physical space for approximating the measured value of the environmental information which is obtained to a design value determined by the spatial distribution calculated based on the conforming space design data.

20

[Claim 6]

The space proposal system according to claim 5, wherein
the outputter outputs the control information to a control device that controls the device provided in the physical space.

25

[Claim 7]

The space proposal system according to claim 5 or 6, wherein
the outputter:

30 generates the control information based on a difference between the measured value of the environmental information which is obtained and the design value; and

outputs the control information, when the spatial distribution recalculated using the control information generated is determined to satisfy the determination criterion.

35

[Claim 8]

A space proposal method comprising:

obtaining space design data indicating a state of a design space;

5 calculating a spatial distribution of environmental information in the design space, based on the space design data; and

 determining, based on the spatial distribution calculated, whether an environment in the design space satisfies a determination criterion used for environmental certification for a

10 physical space.

[Claim 9]

A program for causing a computer to execute the space proposal method according to claim 8.