SUMMARY

TECHNICAL PROBLEM

[0004] Meanwhile, under a situation where positioning of a moving body is performed by using a wireless signal transmitted from a satellite, such as the GNSS, in an environment of being covered with a shield, such as a roof and a wall surface, for example, in indoors and in underground facilities, highly accurate positioning is difficult in in some cases due to the wireless signal being blocked by the shield.

[0005] In view of the above-described problem, an object of the present disclosure is to ensure positioning in a more preferred aspect even under a situation where it is difficult to maintain a state where a wireless signal from a satellite is regularly receivable.

SOLUTION TO PROBLEM

[0006] An information processing device according to a first aspect of the present disclosure includes: a first obtainer configured to obtain first information relating to an absolute position and posture in a real space of a predetermined housing; a second obtainer configured to sequentially obtain second information corresponding to a change in relative position of the housing in chronological order; and an estimator configured to estimate the absolute position in the real space of the housing at a time point at which the change in relative position of the housing

indicated by the second information has been detected with the absolute position and posture of the housing corresponding to the first information as a reference. The first information is calculated based on information relating to an absolute position and posture in a real space of a reference point, the information is obtained from the reference point as a result of the housing approaching the reference point disposed in the real space, the reference point is disposed such that a surface configured to detect the approach of the housing extends along a vertical direction, the first information is obtained with a relative posture of the housing with respect to the reference point satisfying a predetermined condition, the first obtainer is configured to evaluate whether a posture of the housing approaching the reference point satisfies the predetermined condition or not, and obtain the first information according to the evaluation result, the reference point has a plurality of the surfaces arranged side by side and configured to detect the approach of the housing, and the first obtainer is configured to evaluate whether the posture of the housing approaching the reference point satisfies the predetermined condition or not, based on information obtained as a result of the housing approaching each of the plurality of surfaces within a predetermined period.

[0006a] An information processing method executed by an information processing device according to a second aspect of the present disclosure

includes: a first obtaining step of obtaining first information relating to an absolute position and posture in a real space of a predetermined housing; a second obtaining step of sequentially obtaining second information corresponding to a change in relative position of the housing in chronological order; and an estimating step of estimating an absolute position in the real space of the housing at a time point at which the change in relative position of the housing indicated by the second information has been detected with the absolute position and posture of the housing corresponding to the first information as a reference. The first information is calculated based on information relating to an absolute position and posture in a real space of a reference point, the information is obtained from the reference point as a result of the housing approaching the reference point disposed in the real space, the reference point is disposed such that a surface configured to detect the approach of the housing extends along a vertical direction, the first information is obtained with a relative posture of the housing with respect to the reference point satisfying a predetermined condition, the first obtainer is configured to evaluate whether a posture of the housing approaching the reference point satisfies the predetermined condition or not, and obtain the first information according to the evaluation result, the reference point has a plurality of the surfaces arranged side by side and

configured to detect the approach of the housing, and the first obtainer is configured to evaluate whether the posture of the housing approaching the reference point satisfies the predetermined condition or not, based on information obtained as a result of the housing approaching each of the plurality of surfaces within a predetermined period.

[0006b] A program according to a third aspect of the present disclosure causes a computer to execute: a first obtaining step of obtaining first information relating to an absolute position and posture in a real space of a predetermined housing; a second obtaining step of sequentially obtaining second information corresponding to a change in relative position of the housing in chronological order; and an estimating step of estimating an absolute position in the real space of the housing at a time point at which the change in relative position of the housing indicated by the second information has been detected with the absolute position and posture of the housing corresponding to the first information as a reference. The first information is calculated based on information relating to an absolute position and posture in a real space of a reference point, the information is obtained from the reference point as a result of the housing approaching the reference point disposed in the real space, the reference point is disposed such that a surface configured to detect the approach of the housing extends along a vertical direction, the first

information is obtained with a relative posture of the housing with respect to the reference point satisfying a predetermined condition, the first obtainer is configured to evaluate whether a posture of the housing approaching the reference point satisfies the predetermined condition or not, and obtain the first information according to the evaluation result, the reference point has a plurality of the surfaces arranged side by side and configured to detect the approach of the housing, and the first obtainer is configured to evaluate whether the posture of the housing approaching the reference point satisfies the predetermined condition or not, based on information obtained as a result of the housing approaching each of the plurality of surfaces within a predetermined period.

ADVANTAGEOUS EFFECTS OF INVENTION

[0007] According to embodiments of the present invention, positioning in a more preferred aspect can be ensured even under a situation where it is difficult to maintain a state where a wireless signal from a satellite is regularly receivable.

BRIEF DESCRIPTION OF DRAWINGS

[0008] [Fig. 1] Fig. 1 is a drawing for describing an outline of a technique relating to positioning.

[Fig. 2] Fig. 2 is a drawing illustrating one example of a hardware configuration of a terminal device.

[Fig. 3] Fig. 3 is an explanatory view regarding a local coordinate system.

[Fig. 4] Fig. 4 is an explanatory view regarding an estimation of an absolute position and posture of a housing.

[Fig. 5] Fig. 5 is an explanatory view regarding an estimating method of the absolute position of the housing.

[Fig. 6] Fig. 6 is an explanatory view regarding the estimating method of the absolute position of the housing.

[Fig. 7] Fig. 7 is an explanatory view regarding a determination of a reference point used for deriving absolute coordinates.

CLAIMS

[Claim 1] An information processing device comprising:

a first obtainer configured to obtain first information relating to an absolute position and posture in a real space of a predetermined housing;

a second obtainer configured to sequentially obtain second information corresponding to a change in relative position of the housing in chronological order; and

an estimator configured to estimate the absolute position in the real space of the housing at a time point at which the change in relative position of the housing indicated by the second information has been detected with the absolute position and posture of the housing corresponding to the first information as a reference,

wherein,

the first information is calculated based on information relating to an absolute position and posture in a real space of a reference point, the information being obtained from the reference point as a result of the housing approaching the reference point disposed in the real space,

the reference point is disposed such that a surface configured to detect the approach of the housing extends along a vertical direction,

the first information is obtained with a relative posture of the housing with respect to the reference point satisfying a predetermined condition,

the first obtainer is configured to evaluate whether a posture of the housing approaching the reference point satisfies the predetermined condition or not, and obtain the first information according to the evaluation result,

the reference point has a plurality of the surfaces arranged side by side and configured to detect the approach of the housing, and

the first obtainer is configured to evaluate whether the posture of the housing approaching the reference point satisfies the predetermined condition or not, based on information obtained as a result of the housing approaching each of the plurality of surfaces within a predetermined period.

[Claim 2] The information processing device according to claim 1, wherein

the information relating to the absolute position and posture in the real space of the reference point is obtained from the reference point based on contactless communication between the housing and the reference point.

[Claim 3] The information processing device according to claim 1, wherein

the first obtainer is configured to evaluate whether the posture of the housing approaching the

reference point satisfies the predetermined condition or not, based on a detection result by a detector configured to detect the approach of the housing with respect to the surface.

[Claim 4] The information processing device according to claim 1, wherein

the first obtainer is configured to obtain the first information when a variation of the changes in relative posture of the housing approaching the reference point detected by a predetermined detector falls within a predetermined range.

[Claim 5] The information processing device according to any one of claims 1 to 4, wherein

the estimator is configured to estimate an absolute position in the real space of the housing at a time point at which the change in relative position of the housing indicated by the second information has been detected based on the second information and the first information obtained at a time point closer to the time point.

[Claim 6] An information processing method executed by an information processing device, the method comprising:

a first obtaining step of obtaining first information relating to an absolute position and posture in a real space of a predetermined housing;

a second obtaining step of sequentially obtaining second information corresponding to a change in

relative position of the housing in chronological order; and

an estimating step of estimating an absolute position in the real space of the housing at a time point at which the change in relative position of the housing indicated by the second information has been detected with the absolute position and posture of the housing corresponding to the first information as a reference,

wherein,

the first information is calculated based on information relating to an absolute position and posture in a real space of a reference point, the information being obtained from the reference point as a result of the housing approaching the reference point disposed in the real space,

the reference point is disposed such that a surface configured to detect the approach of the housing extends along a vertical direction,

the first information is obtained with a relative posture of the housing with respect to the reference point satisfying a predetermined condition,

the first obtainer is configured to evaluate whether a posture of the housing approaching the reference point satisfies the predetermined condition or not, and obtain the first information according to the evaluation result,

the reference point has a plurality of the

surfaces arranged side by side and configured to detect the approach of the housing, and

the first obtainer is configured to evaluate whether the posture of the housing approaching the reference point satisfies the predetermined condition or not, based on information obtained as a result of the housing approaching each of the plurality of surfaces within a predetermined period.

[Claim 7] A program for causing a computer to execute:

a first obtaining step of obtaining first information relating to an absolute position and posture in a real space of a predetermined housing;

a second obtaining step of sequentially obtaining second information corresponding to a change in relative position of the housing in chronological order; and

an estimating step of estimating an absolute position in the real space of the housing at a time point at which the change in relative position of the housing indicated by the second information has been detected with the absolute position and posture of the housing corresponding to the first information as a reference,

wherein,

the first information is calculated based on information relating to an absolute position and posture in a real space of a reference point, the

information being obtained from the reference point as a result of the housing approaching the reference point disposed in the real space,

the reference point is disposed such that a surface configured to detect the approach of the housing extends along a vertical direction,

the first information is obtained with a relative posture of the housing with respect to the reference point satisfying a predetermined condition,

the first obtainer is configured to evaluate whether a posture of the housing approaching the reference point satisfies the predetermined condition or not, and obtain the first information according to the evaluation result,

the reference point has a plurality of the surfaces arranged side by side and configured to detect the approach of the housing, and

the first obtainer is configured to evaluate whether the posture of the housing approaching the reference point satisfies the predetermined condition or not, based on information obtained as a result of the housing approaching each of the plurality of surfaces within a predetermined period.