created based on each of the plurality of pieces of data acquired in advance at a normal time.

[0006]

Meanwhile, a type or the number of the "other plurality of pieces of data affecting the data" is enormous, and the larger the scale of the plant, the larger the data. Therefore, the statistical model required for the calculation of the prediction value is often very complicated, and in order to obtain an accurate statistical model, it is necessary to perform training in advance by using data having a huge number of samples.

[0007]

Meanwhile, a time that can be spent on training is limited, and it is often difficult to perform training by using data having a sufficient number of samples. When the training of the statistical model is completed with a small number of samples of data, calculation accuracy of the prediction value is reduced. Therefore, it becomes difficult to determine the presence or absence of an abnormality in comparison with the actual measurement value. That is, a difference between a normal time and an abnormal time becomes less visible for each of the measured data.

[0008]

Embodiments of the present invention provide a determination device, a determination method, a program for a determination device, and a plant system capable of accurately determining an abnormality in a plant.

Solution to Problem

[0009]

According to a first aspect of the present invention, there is provided a determination device that determines an abnormality in a plant, the determination device including: a data acquisition unit that acquires data from a plurality of sensors provided at the plant; and a determination unit that determines presence or absence of the abnormality based on the data acquired by the data acquisition unit and a statistical model indicating a correlation between a plurality of pieces of data. The plurality of sensors provided at the plant include a prediction target sensor. The determination unit of the determination device

calculates a prediction value of data acquired from the prediction target sensor, based on data acquired from the sensor which is provided at the same system as the prediction target sensor and which measures the same type of physical quantity as the prediction target sensor among the plurality of sensors, and determines the presence or absence of the abnormality, based on the prediction value and an actual measurement value of the data acquired from the prediction target sensor.

[0010]

In the determination device having such a configuration, the prediction value of the data acquired by the prediction target sensor is calculated by using the data acquired from the sensor which is provided at the same system as the prediction target sensor and which measures the same type of physical quantity as the prediction target sensor. In this case, the statistical model used for calculating the prediction value is a model indicating a relationship between the pieces of data consisting of the same type of physical quantity in the same system. Therefore, the statistical model is relatively simple and it is easier to represent the statistical model by a mathematical expression or the like than in a case where the data includes a plurality of types of physical quantities. Therefore, even in a case where the number of pieces of data used for training the statistical model is small, it is possible to calculate the prediction value with higher accuracy than in the related art. In a case where the abnormality occurs, a difference between the actual measurement value actually acquired by the prediction target sensor and the prediction value calculated as a value at a normal time becomes remarkable. Therefore, it is possible to accurately determine the presence or absence of the abnormality based on both the actual measurement value and the prediction value.

[0010a]

According to a second aspect of the present invention, there is provided a determination method of determining an abnormality in a plant, the determination method including: an acquisition process of acquiring data from a plurality of sensors provided at the plant; and a determination process of determining presence or absence of the

abnormality based on the data acquired in the acquisition process and a statistical model indicating a correlation between a plurality of pieces of data, wherein the plurality of sensors include a prediction target sensor, and in the determination process, a prediction value of data acquired from the prediction target sensor is calculated based on data acquired from the sensor which is provided at the same system as the prediction target sensor and which measures the same type of physical quantity as the prediction target sensor among the plurality of sensors, and the presence or absence of the abnormality is determined based on the prediction value and an actual measurement value of the data acquired from the prediction target sensor.

[0010b]

According to a third aspect of the present invention, there is provided a program for a determination device that determines an abnormality in a plant, the program causing the determination device to execute: data acquisition processing of acquiring data from a plurality of sensors provided at the plant; and determination processing of determining presence or absence of the abnormality based on the data acquired in the data acquisition processing and a statistical model indicating a correlation between a plurality of pieces of data, wherein the plurality of sensors include a prediction target sensor, and the program causes the determination device to execute: as the determination processing, processing of calculating a prediction value of data acquired from the prediction target sensor, based on data acquired from the sensor which is provided at the same system as the prediction target sensor and which measures the same type of physical quantity as the prediction target sensor among the plurality of sensors, and determining the presence or absence of the abnormality, based on the prediction value and an actual measurement value of the data acquired from the prediction target sensor.

[0010c]

According to a fourth aspect of the present invention, there is provided a plant system including: a plant; and a determination device that determines an abnormality in a plant, wherein the determination device includes

a data acquisition unit that acquires data from a plurality of sensors provided at the plant, and a determination unit that determines presence or absence of the abnormality based on the data acquired by the data acquisition unit and a statistical model indicating a correlation between a plurality of pieces of data, the plurality of sensors include a prediction target sensor, and the determination unit calculates a prediction value of data acquired from the prediction target sensor, based on data acquired from the sensor which is provided at the same system as the prediction target sensor and which measures the same type of physical quantity as the prediction target sensor among the plurality of sensors, and determines the presence or absence of the abnormality, based on the prediction value and an actual measurement value of the data acquired from the prediction target sensor.

Advantageous Effects of Invention

[0011]

According to embodiments of the present invention, there is provided a determination device, a determination method, a program for a determination device, and a plant system capable of accurately determining an abnormality in a plant.

Brief Description of Drawings

[0012]

Fig. 1 is a diagram schematically illustrating an overall configuration of a plant system according to an embodiment.

Fig. 2 is a diagram in which a plurality of sensors provided at a plant are collectively illustrated for each system.

Fig. 3 is a diagram for describing a function of a determination unit or the like included in a determination device.

Fig. 4 is a flowchart illustrating a flow of processing executed by the determination device.

Fig. 5 is a diagram illustrating an example of information displayed on a screen of a monitoring terminal.