Summary of Invention

Technical Problem

[0004]

Among alarms, there is an alarm that has low urgency or low importance and thus, does not require action even in a case where the alarm is generated. Thus, an operator of a plant determines whether or not to perform any kind of action with respect to the alarm when the alarm is generated. Identifying a generation tendency of the alarm in the past may be effective in order to determine whether or not action is required with respect to the alarm.

[0005]

Embodiments of the present invention provide a display device, a control device, and a control method that enable easy identification of a generation tendency of an alarm in the past.

Solution to Problem

[0006]

According to a first aspect of the present invention, there is provided a display device that displays an operation state of a plant, wherein statistical information for each type of an alarm generated in the plant is displayed in an aspect of being associated with the type of the alarm, the statistical information includes information related to a number of generations of past alarms of a same type as the alarm generated in the plant, and information about a tendency of change of the past alarm in different time periods, and the alarm generated in the plant is mapped and displayed on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plant.

[0007]

[0008]

In an embodiment, the tendency of change may include a tendency of change in an average number of generations of the alarm between a first period and a second period.

[0009]

In an embodiment, the tendency of change may include a tendency of change in a standard deviation of the number of generations of the alarm between a first period and a second period.

[0010]

In an embodiment, the tendency of change may include a tendency of change in a maximum value of the number of generations of the alarm per day between a first period and a second period.

[0011]

In an embodiment, the statistical information may include information about the number of elapsed days from a first or last day on which the alarm is generated.

[0012]

In an embodiment, the statistical information may include information about the number of elapsed days from a day on which the maximum number of issues of the alarm per day is made.

[0013]

In an embodiment of the display device, importance or urgency of action determined with respect to the alarm based on an average number of generations of the alarm in the predetermined period and on the number of days on which the alarm is generated in the predetermined period may be displayed.

[0014]

According to a second aspect of the present invention, there is provided a control device that controls a display device which displays an operation state of a plant, the control device including: an acquisition unit that acquires alarm information related to an alarm generated in the plant; a calculation unit that calculates statistical information related to the generation of the alarm for each type of the alarm based on the alarm information acquired by the acquisition unit, the statistical information including information related to a number of generations of past alarms of a same type as the alarm generated in the plant; and a display control unit that displays the calculated statistical information and the type of the alarm on the display device in association with each other, the display control unit mapping and displaying the alarm generated in the plant on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plan.

[0015]

In an embodiment, the control device may further include a reception unit that receives a selection of a period, in which the display control unit displays the statistical information in the selected period and the type of the alarm on the display device in association with each other.

[0016]

According to a third aspect of the present invention, there is provided a control method of controlling a display device that displays an operation state of a plant, the control method including: acquiring alarm information related to an alarm generated in the plant; calculating statistical information related to the generation of the

alarm for each type of the alarm based on the acquired alarm information; calculating the statistical information including information related to a number of generations of past alarms of a same type as the alarm generated in the plant, and information about a tendency of change of the past alarm in different time periods; displaying the calculated statistical information and the type of the alarm on the display device in association with each other; and mapping and displaying the alarm generated in the plant on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plant.

[0017]

In an embodiment of the control method, a selection of a period may be received, and the displaying may include displaying the statistical information in the selected period and the type of the alarm on the display device in association with each other.

[0018]

According to a fourth aspect of the present invention, there is provided a computer-readable storage medium storing a program causing a computer to execute a control method of controlling a display device that displays an operation state of a plant, the control method including: acquiring alarm information related to an alarm generated in the plant; calculating statistical information related to the generation of the alarm for each type of the alarm based on the acquired alarm information; calculating the statistical information including information related to a number of generations of past alarms of a same type as the alarm generated in the plant, and information about a tendency of change of the past alarm in different time periods; displaying the calculated statistical information

and the type of the alarm on the display device in association with each other; and mapping and displaying the alarm generated in the plant on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plant.

[0019]

Arbitrary combinations of the above components, and substitution of the components and expressions of the present invention with each other among a method, a device, a system, a computer program, a data structure, a recording medium, and the like are also valid as an aspect of the present invention.

Advantageous Effects of Invention

[0020]

According to embodiments of the present invention, it is possible to provide a display device, a control device, and a control method that enable identification of a generation tendency of an alarm in the past.

Brief Description of Drawings

[0021]

Fig. 1 is a schematic diagram illustrating an overall configuration of a plant according to the present embodiment.

Fig. 2 is a block diagram illustrating a configuration of a system according to the present embodiment.

CLAIMS

1. A display device that displays an operation state of a plant,

wherein statistical information for each type of an alarm generated in the plant is displayed in an aspect of being associated with the type of the alarm,

the statistical information includes information related to a number of generations of past alarms of a same type as the alarm generated in the plant, and information about a tendency of change of the past alarm in different time periods, and

the alarm generated in the plant is mapped and displayed on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plant.

2. The display device according to claim 1,

wherein the tendency of change includes a tendency of change in an average number of generations of the past alarm between a first period and a second period.

3. The display device according to claim 1,

wherein the tendency of change includes a tendency of change in a standard deviation of a number of generations of the past alarm between a first period and a second period.

4. The display device according to claim 2,

wherein the tendency of change includes a tendency of change in a maximum value of a number of generations of the past alarm per day between a first period and a second period.

5. The display device according to any one of claims 1 to 4,

wherein the statistical information includes information about a number of elapsed days from a first or last day on which the past alarm is generated.

6. The display device according to any one of claims 1 to 5,

wherein the statistical information includes information about the number of elapsed days from a day on which a maximum number of issues of the past alarm per day is made.

7. The display device according to any one of claims 1 to 6,

wherein importance or urgency of action determined with respect to the alarm based on an average number of generations of the past alarm in the predetermined period and on a number of days on which the past alarm is generated in the predetermined period is displayed.

8. A control device that controls a display device which displays an operation state of a plant, the control device comprising:

an acquisition unit that acquires alarm information related to an alarm generated in the plant;

a calculation unit that calculates statistical information related to the generation of the alarm for each type of the alarm based on the alarm information acquired by the acquisition unit, the statistical information including information related to a number of generations of past alarms of a same type as the alarm generated in the plant; and

a display control unit that displays the calculated statistical information and the type of the alarm on the display device in association with each other, the display control unit mapping and displaying the alarm generated in the plant on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plan.

9. The control device according to claim 8, further comprising:

a reception unit that receives a selection of a period,

wherein the display control unit displays the statistical information in the selected period and the type of the alarm on the display device in association with each other.

10. A control method of controlling a display device that displays an operation state of a plant, the control method comprising:

acquiring alarm information related to an alarm generated in the plant;

calculating statistical information related to the generation of the alarm for each type of the alarm based on the acquired alarm information;

calculating the statistical information including information related to a number of generations of past alarms of a same type as the alarm generated in the plant, and information about a tendency of change of the past alarm in different time periods;

displaying the calculated statistical information and the type of the alarm on the display device in association with each other; and

mapping and displaying the alarm generated in the plant on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plant.

11. The control method according to claim 10,

wherein a selection of a period is received, and

the displaying includes displaying the statistical information in the selected period and the type of the alarm on the display device in association with each other.

12. A computer-readable storage medium storing a program causing a computer to execute a control method of controlling a display device that displays an operation state of a plant, the control method comprising:

acquiring alarm information related to an alarm generated in the plant;

calculating statistical information related to the generation of the alarm for each type of the alarm based on the acquired alarm information;

calculating the statistical information including information related to a number of generations of past alarms of a same type as the alarm generated in the plant, and information about a tendency of change of the past alarm in different time periods;

displaying the calculated statistical information and the type of the alarm on the display device in association with each other; and

mapping and displaying the alarm generated in the plant on an alarm map based on multiple types of the statistical information related to the number of generations of past alarms of a same type as the alarm generated in the plant.

13. The computer-readable storage medium according to claim 12,

wherein a selection of a period is received, and

the displaying includes displaying the statistical information in the selected period and the type of the alarm on the display device in association with each other.