

## Solution to Problem

[0006]

According to an aspect of the present invention, there is provided a display device that displays an operation state of a plant, in which for a plurality of alarms generated in the plant, a generation frequency of each alarm type indicating a type of the alarm in a first period is displayed in an aspect of being arranged for each alarm type, and a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant are displayed in time series.

[0007]

In an embodiment of the display device, the displaying of the generation frequency of each alarm type in the first period in the aspect of being arranged for each alarm type may be displaying the generation frequency of each alarm type in the first period in a graph form.

[0008]

In an embodiment of the display device, the displaying of the generation frequency of each alarm type in the first period in the aspect of being arranged for each alarm type may be arranging and displaying bar graphs corresponding to the generation frequency of each alarm type in the first period in a descending order or an ascending order of the generation frequency for each alarm type.

[0009]

In an embodiment of the display device, for the alarm type of which the generation frequency in the first period

is displayed, a generation history of the alarm type in a second period included in the first period may be further displayed.

[0010]

In an embodiment of the display device, a generation history of a related event related to the alarm type in the second period may be further displayed together with the generation history of the alarm type in the second period.

[0011]

In an embodiment of the display device, the related event may be a process of the plant or may be the alarm of a different type from the alarm type of which the generation frequency in the first period is displayed.

[0012]

In an embodiment of the display device, the first period may be a period of a part of an operation period of the plant.

[0013]

In an embodiment of the display device, the generation frequency may be a number of generations of each alarm type in the first period.

[0014]

According to another aspect of the present invention there is provided a control device that controls a display device that displays an operation state of a plant, the control device including an acquisition unit that acquires alarm information indicating an alarm generated in the plant, a calculation unit that calculates a generation frequency of each alarm type indicating a type of the alarm

in a first period based on the alarm information, and a display control unit that causes the display device to display the calculated generation frequency of each alarm type in the first period in an aspect of being arranged for each alarm type and to display a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant in time series.

[0015]

In an embodiment, the control device may further include a generation unit that, for the alarm type of which the generation frequency in the first period is displayed, generates generation history information indicating a generation history of the alarm type in a second period included in the first period based on the alarm information, in which the display control unit causes the display device to further display the generated generation history information in the second period.

[0016]

In an embodiment of the control device, the display control unit may cause the display device to further display a graph form in which generation of the alarm type is arranged in time series based on the generated generation history information in the second period.

[0017]

In an embodiment, the control device may further include a reception unit that receives a selection of a related event related to the alarm type of which the generation frequency in the first period is displayed, in

which the generation unit generates generation history information indicating a generation history of the selected related event in the second period based on process information of the plant or on the alarm information, and the display control unit causes the display device to display the generated generation history information of the related event in the second period together with the generated generation history information of the alarm type.

[0018]

In an embodiment of the control device, the display control unit may cause the display device to further display a graph form in which generation of the alarm type is arranged in time series based on the generated generation history information of the alarm type in the second period and in which generation of the related event is arranged in time series based on the generated generation history information of the related event in the second period.

[0019]

In an embodiment, the control device may further include a correctness input unit configured to input correctness of generation of the alarm type of which the generation frequency in the first period is displayed.

[0020]

According to another 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 a step of acquiring alarm information indicating an alarm generated in the plant, a

step of calculating a generation frequency of each alarm type indicating a type of the alarm in a first period based on the alarm information, and a step of causing the display device to display the calculated generation frequency of each alarm type in the first period in an aspect of being arranged for each alarm type and to display a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant in time series.

[0021]

According to another aspect of the present invention, there is provided a program for controlling a display device that displays an operation state of a plant, the program causing a computer to execute a step of acquiring alarm information indicating an alarm generated in the plant, a step of calculating a generation frequency of each alarm type indicating a type of the alarm in a first period based on the alarm information, and a step of causing the display device to display the calculated generation frequency of each alarm type in the first period in an aspect of being arranged for each alarm type and to display a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant in time series.

## CLAIMS

1. A display device that displays an operation state of a plant,  
wherein for a plurality of alarms generated in the plant, a generation frequency of each alarm type indicating a type of the alarm in a first period is displayed in an aspect of being arranged for each alarm type, and a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant are displayed in time series.
2. The display device according to claim 1,  
wherein the displaying of the generation frequency of each alarm type in the first period in the aspect of being arranged for each alarm type is displaying the generation frequency of each alarm type in the first period in a graph form.
3. The display device according to claim 2,  
wherein the displaying of the generation frequency of each alarm type in the first period in the aspect of being arranged for each alarm type is arranging and displaying bar graphs corresponding to the generation frequency of each alarm type in the first period in a descending order or an ascending order of the generation frequency for each alarm type.
4. The display device according to any one of claims 1 to 3,  
wherein for the alarm type of which the generation frequency in the first period is displayed, a generation history of the alarm type in a second period included in the first period is further displayed.
5. The display device according to claim 4,  
wherein a generation history of a related event related to the alarm type in the second period is further displayed together with the generation history of the alarm type in the second period.
6. The display device according to claim 5,  
wherein the related event is a process of the plant or is the alarm of a different type from the alarm type of which the generation frequency in the first period is displayed.

7. The display device according to any one of claims 1 to 6,  
wherein the first period is a period of a part of an operation period of the plant.
8. The display device according to any one of claims 1 to 7,  
wherein the generation frequency is a number of generations of each alarm type  
in the first period.
9. A control device that controls a display device that displays an operation  
state of a plant, the control device comprising:  
an acquisition unit that acquires alarm information indicating an alarm  
generated in the plant;  
a calculation unit that calculates a generation frequency of each alarm type  
indicating a type of the alarm in a first period based on the alarm information; and  
a display control unit that causes the display device to display the calculated  
generation frequency of each alarm type in the first period in an aspect of being  
arranged for each alarm type and to display a predetermined state of process data that  
affects operation efficiency in real time and indexes of efficiency related to an operation  
of the plant in time series.
10. The control device according to claim 9, further comprising:  
a generation unit that, for the alarm type of which the generation frequency in  
the first period is displayed, generates generation history information indicating a  
generation history of the alarm type in a second period included in the first period based  
on the alarm information,  
wherein the display control unit causes the display device to further display the  
generated generation history information in the second period.
11. The control device according to claim 10,  
wherein the display control unit causes the display device to further display a  
graph form in which generation of the alarm type is arranged in time series based on the  
generated generation history information in the second period.
12. The control device according to claim 10 or 11, further comprising:  
a reception unit that receives a selection of a related event related to the alarm  
type of which the generation frequency in the first period is displayed,

wherein the generation unit generates generation history information indicating a generation history of the selected related event in the second period based on process information of the plant or on the alarm information, and

the display control unit causes the display device to display the generated generation history information of the related event in the second period together with the generated generation history information of the alarm type in the second period.

13. The control device according to claim 12,

wherein the display control unit causes the display device to further display a graph form in which generation of the alarm type is arranged in time series based on the generated generation history information of the alarm type in the second period and in which generation of the related event is arranged in time series based on the generated generation history information of the related event in the second period.

14. The control device according to claim 13, further comprising:

a correctness input unit configured to input correctness of generation of the alarm type of which the generation frequency in the first period is displayed.

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

a step of acquiring alarm information indicating an alarm generated in the plant;

a step of calculating a generation frequency of each alarm type indicating a type of the alarm in a first period based on the alarm information; and

a step of causing the display device to display the calculated generation frequency of each alarm type in the first period in an aspect of being arranged for each alarm type and to display a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant in time series.

16. A program for controlling a display device that displays an operation state of a plant, the program causing a computer to execute:

a step of acquiring alarm information indicating an alarm generated in the plant;

a step of calculating a generation frequency of each alarm type indicating a type of the alarm in a first period based on the alarm information; and

a step of causing the display device to display the calculated generation frequency of each alarm type in the first period in an aspect of being arranged for each alarm type and to display a predetermined state of process data that affects operation efficiency in real time and indexes of efficiency related to an operation of the plant in time series.