[0063]

In addition, the abnormal state determination unit 117 determines that flame is generated in the vehicle and the surrounding space of the vehicle, or that there is a risk of flame generation therein, based on a flame generation status from the flame generation detection unit 116. For example, in a case where a flame generation status from the flame generation detection unit 116 is indicated by the degree of flame generation, it may be determined that flame is generated in the vehicle and the surrounding space of the vehicle, or that there is a risk of flame generation therein, when the degree of flame generation is 70% or more.

[0064]

FIG. 4C is a diagram illustrating an example of the determination information DB 123 in which determination results determined by the abnormal state determination unit 117 are stored. In the example illustrated in FIG. 4C, for example, in the case of camera 1, it is determined that no fire has occurred. On the other hand, in the example illustrated in FIG. 4C, in the case of camera X, based on the acquired camera information, it is determined that a fire has occurred in all of the following determinations: determination based on temperature information, determination based on temperature change information, smoke detection, and flame detection, and the determination result indicates that a fire has occurred.

[0065]

The notification unit 118, when it is determined that a fire has occurred, or that there is a risk of fire, notifies at least one of the rotating light 60, the alarm device 70, the user terminal 30, and the administrator terminal 20 provided on the automobile carrier ship that a fire has occurred, or that there is a risk of fire.

[0066]

For example, the notification unit 118 may provide different content depending on whether it is determined that a fire has occurred or that there is a risk of fire when notifying the rotating light 60. For example, the notification unit 118 may send a notification such that the rotation speed of the rotating light 60 becomes faster when it is determined that a fire has occurred compared to when it is determined that there is a risk

[0073]

In step S504, when the rapid temperature rise detection unit 114 determines that a rapid temperature rise has occurred (step S504: YES), the processing proceeds to step S507. On the other hand, in step S504, when the rapid temperature rise detection unit 114 determines that a rapid temperature rise has not occurred (step S504: NO), the processing proceeds to step S505.

[0074]

In step S505, the smoke generation detection unit 115 detects, based on the camera information, whether or not smoke is generated in the vehicle 50 and the surrounding space of the vehicle 50. Specifically, the smoke generation detection unit 115 detects whether or not smoke is generated in the vehicle and the surrounding space of the vehicle based on the acquired camera information, using a model pre-trained on images in which smoke is generated.

[0075]

In step S505, when the smoke generation detection unit 115 detects that smoke is generated in the vehicle 50 and the surrounding space of the vehicle 50 (step S505: YES), the processing proceeds to step S507. On the other hand, in step S505, when the smoke generation detection unit 115 detects that smoke is not generated in the vehicle 50 and the surrounding space of the vehicle 50 (step S505: NO), the processing proceeds to step S506.

[0076]

In step S506, the flame generation detection unit 116 detects, based on the camera information, whether or not flame is generated in the vehicle 50 and the surroundings of the vehicle 50. Specifically, the flame generation detection unit 116 detects whether or not flame is generated in the vehicle 50 and the surrounding space of the vehicle 50 based on the acquired camera information, using a model pre-trained on images in which flame is generated.

[0077]

In step S506, when the flame generation detection unit 116 detects that flame is generated in the vehicle 50 and the surrounding space of the vehicle 50 (step S506: YES),

fire has occurred compared to when it is determined that there is a risk of fire. This allows crew members who hear the sound of the alarm device 70, see the display on the user terminal 30, or see the display on the administrator terminal 20 to recognize the level of urgency with respect to the fire occurrence or risk of occurrence.

[0082]

As described above, the abnormal state detection apparatus 100 according to the present embodiment is the abnormal state detection apparatus 100 that detects a fire occurring in the vehicle 50 loaded on an automobile carrier ship. The abnormal state detection apparatus 100 includes the navigation information acquisition unit 111 that acquires navigation position information of the automobile carrier ship. The abnormal state detection apparatus 100 also includes the camera information acquisition unit 112 that acquires camera information, which is information including image data of the vehicle and the surrounding space of the vehicle captured by a camera. The abnormal state detection apparatus 100 also includes the temperature information acquisition unit 113 that acquires, based on the camera information, the temperature information of the vehicle 50 and the surrounding space of the vehicle 50, and the temperature change information per unit time. The abnormal state detection apparatus 100 also includes the abnormal state determination unit 117 that determines, based on assumed temperature information based on the position information, the temperature information, and the temperature change information, whether or not a fire has occurred in the vehicle 50 and the surrounding space of the vehicle 50, or whether there is a risk of fire therein. The abnormal state detection apparatus 100 also includes the notification unit 118 that, when a determination is made by the abnormal state determination unit 117 that a fire has occurred, or that there is a risk of fire, sends a notification that a fire has occurred, or that there is a risk of fire. Note that the notification unit 118 notifies at least one of the rotating light 60, the alarm device 70, the user terminal 30, and the administrator terminal 20 provided on the automobile carrier ship that a fire has occurred, or that there is a risk of fire.

[0083]

With this configuration, the abnormal state detection apparatus 100 enables