[DESCRIPTION]

[Title of Invention]

MONITORING SYSTEM, MONITORING METHOD AND PROGRAM

[Technical Field]

[0001]

The present invention relates to a monitoring system, a monitoring method and program for visual and/or audio. More specifically, the present invention relates to monitoring systems for detecting and reacting to abnormal events by real-time analysis technologies.

[Background Art]

[0002]

The real-time analysis technologies such as video analysis and audio analysis can detect abnormal events in the field. Generally, operators manually analyze data from sensors located near an event to become aware of a situation or to learn details of an event. The operators manually select related information from periodic or continuous sensor data to become more aware of the situation or to learn more details of the event. This procedure leads to delay in the operators' reaction to abnormal events because the analysis results and the sensor data used for the analysis may be insufficient to make a decision for responding to the event.

[Summary of Invention]

[Technical Problem]

[0003]

What is needed is a system which can automatically select and control sensors to show details of events including views providing a closer look and overviews providing a wider look at the event as it unfolds so that the operators can respond promptly based on the information in the views provided. Furthermore, other desirable features and characteristics will become apparent from the subsequent detailed description and the appended claims, taken in conjunction with the accompanying drawings and this background of the disclosure.

[0004]

In view of above, a main object of the present invention is to provide a monitoring system and the like that can detect and react to abnormal events in real-time.

[Solution to Problem]
[0005]

An exemplary aspect of the present invention is a monitoring system for event related data from a plurality of sensors, including: a receiver that receives the event related data from a plurality of sensors; a coverage analyzer that analyzes predetermined data and the event related data from the receiver; and a sensor selector. The predetermined data includes sensor coverage information. The sensor selector is coupled to the coverage analyzer and selects one or more of the plurality of sensors based on the analysis by the coverage analyzer, wherein the sensor coverage information includes information concerning Field of Regarding (FOR) of the plurality of sensors.

[0006]

An exemplary aspect of the present invention is a monitoring method for event related data from a plurality of sensors, including: receiving the event related data from a plurality of sensors; analyzing predetermined data and the event related data, the predetermined data including sensor coverage information; and selecting one or more of the plurality of sensors based on the analysis, wherein the sensor coverage information includes information concerning Field of Regarding (FOR) of the plurality of sensors..

[0007]

An exemplary aspect of the present invention is a non-transitory computer readable recording medium storing program for monitoring event related data from a plurality of sensors, and the program causes a computer to execute processing of: receiving the event related data from a plurality of sensors; analyzing predetermined data and the event related data, the predetermined data including map information and sensor coverage information; and selecting one or more of the plurality of sensors based on the analysis, wherein the sensor coverage information includes information concerning Field of Regarding (FOR) of the plurality of sensors.

[Advantageous Effects of Invention]
[0008]

According to the present invention, a monitoring system and the like that can detect and react to abnormal events in real-time can be provided.

[Brief Description of Drawings]
[0009]

The accompanying figures, where like reference numerals refer to identical or functionally similar elements throughout the separate views and which together with the detailed description below are incorporated in and form part of the specification, serve to illustrate various exemplary embodiments and to explain various principles and exemplary advantages in accordance with the present invention. Exemplary features and advantages of the present invention will become apparent from the following detailed description when taken with the accompanying drawings in which:

[Fig. 1]Fig. 1 is a schematic diagram of sensors used with a monitoring system of a Related Art.

[Fig. 2]Fig. 2 is a schematic diagram of sensors used with a monitoring system in accordance with the exemplary embodiments of the present invention.

[Fig. 3]Fig. 3 is a block diagram of a monitoring system in accordance with the exemplary embodiments of the present invention.

[Fig. 4]Fig. 4 is a flowchart in accordance with the exemplary embodiments of the present invention.

[Fig. 5]Fig. 5 is a block diagram of a monitoring system in accordance with another embodiment of the present invention.

[Fig. 6]Fig. 6 is a flowchart in accordance with another embodiment of the present invention.

[Fig. 7]Fig. 7 is a schematic diagram of sensors used with a monitoring system in a first exemplary embodiment of the present invention.

[CLAIMS]

[Claim 1]

A monitoring system for event related data from a plurality of sensors, comprising:

receiver means for receiving the event related data from a plurality of sensors;
coverage analyzer means for analyzing predetermined data and the event related data from the receiver means, the predetermined data including sensor coverage information; and
sensor selector means, coupled to the coverage analyzer means, for selecting one or more of the plurality of sensors based on the analysis by the coverage analyzer means, wherein the sensor coverage information includes information concerning Field of Regarding (FOR) of the plurality of sensors.

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[Claim 2]
The system in accordance with claim 1, further comprising a sensor actuator means, coupled to the sensor selector means and the plurality of sensors, for actuating the one or more of the plurality of sensors selected by the sensor selector means.

[Claim 3]
The system in accordance with claim 1 or 2, wherein the predetermined data further includes map information concerning wall or other space defining structures.

[Claim 4]
The system in accordance with claim 1 or 2, wherein the sensor coverage information includes information concerning Field of View (FOV) of the plurality of sensors.

[Claim 5]
The system in accordance with any one of claims 1 to 4, wherein the coverage analyzer means analyzes data based on installed configurations of sensors, the sensor coverage information and the map information.

[Claim 6]
The system in accordance with claim 5, wherein the coverage analyzer means determines one or more of the plurality of sensors that may capture an object as it moves away from an event location in response to the installed configurations of sensors and the event related data.

[Claim 7]
The system in accordance with any one of claims 1 to 6, wherein the coverage analyzer means analyzes the data in accordance with a rule based algorithm method, a machine learning algorithm method and/or a geographical map based algorithm method.

[Claim 8]
The system in accordance with any one of claims 1 to 7, wherein the

coverage analyzer means analyzes the data in accordance with a clustering algorithm in order to cluster the plurality of sensors into one or more suitable sensor clusters and one or more unsuitable sensor clusters.

[Claim 9]

The system in accordance with any one of claims 6 to 8, wherein the coverage analyzer means determines one or more of the plurality of sensors that may monitor an unfolding event in response to the installed configurations of sensors, the sensor coverage information, the map information and the event related data.

[Claim 10]

The system in accordance with claim 9, wherein the coverage analyzer means determines one or more of the plurality of sensors that may monitor the unfolding event, and wherein the one or more of the plurality of sensors includes at least one of the plurality of sensors that captures a large portion of space defined within the space defining structures of the map information.

[Claim 11]

The system in accordance with claim 9, wherein the coverage analyzer means determines one or more of the plurality of sensors that may monitor the unfolding event and outputs selection data to the sensor selector means comprising identification of the one or more of the plurality of sensors that may monitor the unfolding event, and wherein the sensor selector means selects one or more of the plurality of sensors in response to the selection data for operator monitoring.

[Claim 12]

The system in accordance with claim 11, wherein selection data includes sensor prioritization scores, and wherein the sensor selector means selects more than one of the plurality of sensors in response to the selection data for operator monitoring in accordance with the sensor prioritization scores.

[Claim 13]

The system in accordance with claim 12, wherein the sensor selector means further outputs a list of the more than one of the plurality of sensors along with corresponding sensor prioritization scores for operator monitoring.

[Claim 14]

The system in accordance with any one of claims 1 to 13, wherein one of the plurality of sensors is a microphone, and wherein the receiver means receives the event related data from the microphone including a direction of an audio input.

[Claim 15]

The system in accordance with any one of claims 1 to 14, wherein the one of the plurality of sensors is a camera having video properties, and wherein the sensor actuator means actuates the camera and the

camera's video properties in response to the sensor selector means' selection based on the analysis by the coverage analyzer means.

[Claim 16]

The system in accordance with any one of claims 1 to 15, further comprising a sensor actuator means, coupled to the sensor selector means and the plurality of sensors, for actuating the one or more of the plurality of sensors selected by the sensor selector means.

[Claim 17]

A monitoring method for event related data from a plurality of sensors, comprising:
receiving the event related data from a plurality of sensors;

analyzing predetermined data and the event related data, wherein the predetermined data including sensor coverage information; and

selecting one or more of the plurality of sensors based on the analysis wherein the sensor coverage information includes information concerning Field of Regarding (FOR) of the plurality of sensors.

[Claim 18]

The method in accordance with claim 17, wherein the sensor coverage information includes Field of View (FOV) information and/or Field of Regarding (FOR) information.

[Claim 19]

A non-transitory computer readable recording medium storing program for monitoring event related data from a plurality of sensors, and the program causes a computer to execute processing of:
receiving the event related data from a plurality of sensors;

analyzing predetermined data and the event related data, wherein the predetermined data including sensor coverage information; and

selecting one or more of the plurality of sensors based on the analysis wherein the sensor coverage information includes information concerning Field of Regarding (FOR) of the plurality of sensors.