# Description

## Title of Invention: SYSTEM FOR MONITORING EVENT RELATED DATA

### Technical Field

[0001] The invention relates to a surveillance system. More specifically, the invention relates to a system for monitoring event related data.

### Background Art

[0002] Surveillance systems such as video surveillance systems have been used in several areas for routine surveillance and for event detection. Abnormal events such as terrorism, riot, theft, fighting, fire, car accidents, etc. are meant to be captured by such surveillance systems.

[0003] However, in some situations, a surveillance camera cannot capture abnormal events within the surveillance area at an appropriate size to adequately cover the abnormal event. Therefore, users, including security officers and police officers, are not able to understand an incident appropriately because a surveillance camera captures only a part of the whole of the event.

[0004] Thus, what is needed and an object of the disclosure is to provide an improved surveillance system that captures abnormal events within a surveillance area at a size appropriate to the abnormal event. 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.

### Summary

[0005] In a first aspect, a system for monitoring event related data including a sensor data analyzer, an event analyzer and an actuator is disclosed. The sensor data analyzer detects events based on sensor data. The event analyzer is coupled to the sensor data analyzer and estimates the size of the entire detected events based on event related data of the detected events from the sensor data analyzer. The actuator is coupled to the sensor data analyzer and the event analyzer and actuates a predetermined device based on the estimated size of the detected entire events.

[0006] In a second aspect, a method for monitoring event related data is disclosed. The method includes detecting events based on sensor data; estimating the size of the entire detected events based on event related data of the detected events; and actuating a predetermined device based on the estimated size of the entire detected events.

[0007] In addition, an embodiment is also achieved by a computer program that achieves the

sponding to the type of event. The users are also able to investigate the incident using the appropriate video footage after the incident.

[0015] Fig. 2 depicts an imaging range adjustment based on sound (zoom-out) 200 in accordance with a present embodiment. Timeline 202 shows 4 steps (A to D) for the imaging range adjustment 200. At step A, Field of View 206 of a camera and microphone array 208 is set at an initial imaging range 204. At step B, the camera and microphone array 208 captures sounds of breaking glass 210 from a direction of arrival 212. At step C, the camera and microphone array 208 further captures sounds of shouting 214 from a direction of arrival 216. At step D, the event size estimation part 108 estimates the size of the event by calculating both right and left maximum angles for Field of View within the direction of the camera in the camera and microphone array 208 and within a predetermined time width. Then, the camera control part 110 controls the camera in the camera and microphone array 208 by comparing the current setting of the camera with the estimated size of the event consisting of the maximum angles and Field of View 206 of the camera and microphone array 208 to cause the camera and microphone array 208 to zoom-out to adjusted imaging range 218.

[0016] Fig. 3 depicts an imaging range adjustment based on sound (zoom-in and controlling the direction of the camera) 300. Timeline 302 shows three steps (A to C) for the imaging range adjustment 300. At step A, a Field of View 306 of a camera and microphone array 308 is set at an initial adjustment range 304. At step B, the camera and microphone array 308 captures sounds of fighting 310 from a direction of arrival 312. At step C, the event size estimation part 108 estimates the size of the event by calculating both right and left maximum angles for Field of View within the direction of the camera and microphone array 308 and within a predetermined time width. Then, the camera control part 110 controls the camera and microphone array 308 by comparing the current setting of the camera with the estimated size of the event consisting of the maximum angles to cause the camera and microphone array 308 to control the direction and Field of View of the camera to rotate and zoom-in to an adjusted imaging range 314.

[0017] Fig. 4 depicts an imaging range adjustment based on the type of sound event (zoom-out) 400. Timeline 402 shows three steps (A to C) for the imaging range adjustment 400. At step A, a Field of View 406 of a camera and microphone array 408 is set at an initial adjustment range 404. At step B, the camera and microphone array 408 captures a sound of an explosion 410 from a direction of arrival 412. At step C, the event size estimation part 108 estimates the size of the event by the type of event (e.g. when the sensor data analysis part 104 detects a large-scale event like the explosion 410, the event size estimation part 108 decides the size of the event is “Large”). Then, the camera control part 110 controls the camera of the camera and microphone array 408 in response to the

received size of the event. When the size is “Large”, the camera control part 110 zooms out the camera to a predetermined setting (the widest setting). Then, the camera control part 110 controls the direction and Field of View of camera to zoom-out to adjusted imaging range 414. When the sensor data analysis part 104 detects a small-scale event like the theft, the event size estimation part 108 can decide the size of the event is “Small”. Also, when the sensor data analysis part 104 detects a medium-scale event like the fire, the event size estimation part 108 can decide the size of the event is “Medium”.

[0018] Fig. 5 depicts an imaging range adjustment using an odor sensor and infrared sensor (zoom-out) 500. Timeline 502 shows four steps (A to D) for the imaging range adjustment 500. At step A, a Field of View 508 of a camera and microphone array 512 is set at an initial adjustment range 510. The sensor data analysis part 104 may receive sensor data captured by any sensing device, such as an odor sensor 504 and an infrared sensor 506, to detect abnormal events.

[0019] At step B, an abnormal odor 514 is detected at the odor sensor 504 within a detected time. At step C, an unusual crowd 516 is detected at the infrared sensor 506. At step D, the event size estimation part 108 estimates the size of the event by calculating both right and left maximum angles for Field of View within the direction of the camera and within a predetermined time width using the sensor’s location information. Then, the camera control part 110 controls the surveillance camera by comparing the current setting of the camera with the estimated size of the event consisting of the maximum angles. The camera control part 110 then controls the camera and microphone array 512 to zoom-out to an adjusted imaging range 518.

[0020] Fig. 6 depicts a flowchart 600 of a method for monitoring event related data in accordance with a present embodiment. A sensor data analyzer detects events based on sensor data (S602). Based on the event related data of the detected events, the size of the detected entire events is estimated (S604). Then, a predetermined device is actuated based on the estimated size of the detected entire events (S606).

[0021] Fig. 7 depicts a display 700 showing the size of the detected entire events on a map in accordance with a present embodiment. In the present embodiment, sounds of breaking glass 702 are detected by a sensor, such as a microphone. Next, crowds 704 are detected by a sensor, such as an infrared sensor. After that sounds of fighting 706 are detected by a sensor such as a microphone. Based on these event related data, the geographical size of the detected entire events 708 is estimated by the event size estimation part 108. A display 700 may be actuated to show the estimated size of the detected entire events on a map.

[0022] Fig. 8 depicts a look-up table 800 for alarm notification system 114 in accordance with a present embodiment. In the present embodiment, an event or a plurality of