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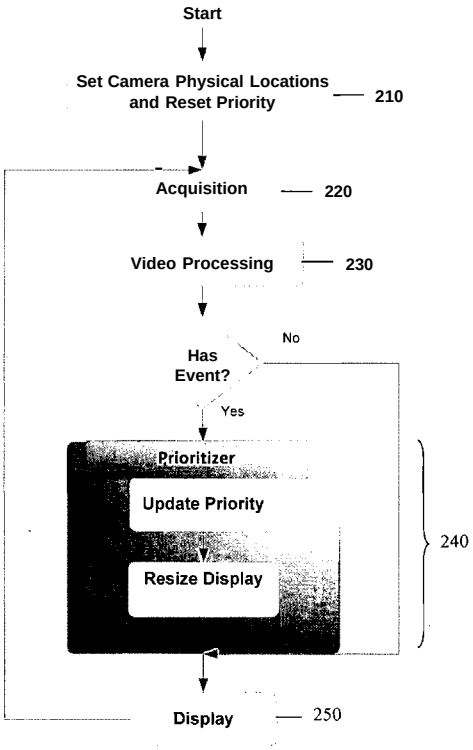
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[Continued on next page]

(54) Title: METHOD AND SYSTEM FOR PRIORITIZING DISPLAYS OF SURVEILLANCE SYSTEM



(57) Abstract: The present invention relates generally to a method and system for prioritizing displays of surveillance system wherein said method and system comprising using of at least one prioritizer (140) for managing prioritization by updating priority value of image displays and resizing said image displays when an event is detected. The size of the displayed image is determined by the normalized priority value obtained based on the predetermined factors which are incorporated prior to application.

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— *as to the identity of the inventor (Rule 4.17(i))*

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METHOD AND SYSTEM FOR PRIORITIZING DISPLAYS OF SURVEILLANCE SYSTEM

1. TECHNICAL FIELD OF THE INVENTION

The present invention relates generally to a method and system for prioritizing displays of surveillance system wherein said method and system comprising using of at least one prioritizer for managing prioritization by updating priority value of image displays and resizing said image displays when an event is detected. The size of the displayed image is determined by the normalized priority value obtained based on the predetermined factors which are incorporated prior to application.

2. BACKGROUND OF THE INVENTION

Surveillance systems are used in a wide number of applications, such as security maintenance and disaster prevention. Surveillance systems are usually being used to keep watch over physical areas to assist in identifying events of interest. Such events and associated data can relate to maintain safety and security, mitigating risk, increasing operational efficiency, preventing loss of products or revenue, gathering business intelligence and a variety of other applications.

Typically surveillance system includes using of one or more cameras which are used to capture video images at a particular location or premises and thereafter transmit the video data to video processing unit for analysis which in turn display the received video data on display device. Oftentimes, security personnel will monitor the output from the video camera which is the image data displayed on the display device. However, this method may also introduces problems which may due to human error as the security personnel may be distracted while watching the video display or ignore a relevant video display while observing a non-relevant video display.

Furthermore, a surveillance system may need to display hundreds of camera images at any given time. Due to the limited display space at the display device, each camera would only gets a small portion of the display space. Since the level of attention a camera receives is directly proportional to its display size, smaller display size means less attention from the security personnel. As a result, if there is a suspicious event occurs, the likelihood that the suspicious event may not be detected increases.

In the past, data processing unit is generally a main controller in determining the output of the component to be displayed in a surveillance system. However, the data processing unit may not be able to prioritize the displays based on the type of event occurred.

It would hence be extremely advantageous if the above shortcoming is alleviated by having a method and system for prioritizing displays of surveillance system.

The present invention overcomes the above shortcoming by automatically increases the display size of cameras based on the detected suspicious events and highlight. Several factors such as event type, camera proximity and past events history are used in the display size computation.

3. SUMMARY OF THE INVENTION

Accordingly, it is the primary aim of the present invention to provide a a method and system for prioritizing displays of surveillance system which is able to perform prioritization based on automated events.

It is yet another object of the present invention to provide a method and system for prioritizing displays of surveillance system which is able to increase the display size of cameras based on the detected suspicious events and highlight.

It is yet another object of the present invention to provide a method and system for prioritizing displays of surveillance system which is able to create more attention to the security personnel on the suspicious events.

Other and further objects of the invention will become apparent with an understanding of the following detailed description of the invention or upon employment of the invention in practice.

In a preferred embodiment a method for prioritizing displays of surveillance system, comprising the steps of:

i. acquiring image data from plurality of image capturing device by at least one data acquisition unit;

ii. processing said acquired image by using at least one data processing unit;

iii. displaying said acquired image on at least one display means;

characterized in that before said step of displaying said acquired image, comprising step of using at least one prioritizer to prioritize said acquired image data by updating the priority value of said acquired image data and resizing the display on said display means;

wherein each of said plurality of image capturing device is pre-assigned with an initial priority value and each of said initial priority value has equal weightage.

According to another embodiment of the present invention there is provided,

A system for prioritizing displays of surveillance system comprising

a plurality of image capturing device;

at least one data processing unit comprises of at least one data acquisition unit to acquire image data from said image capturing device;

at least one display means;

characterized in that said data processing unit (130) further comprises of at least one prioritizer (140); wherein said prioritizer (140) is activated by said data processing unit (130) for managing prioritization when an event is detected by said image capturing device (110) before said acquired image data from said image capturing device (110) is displayed on said display means (150).

4. BRIEF DESCRIPTION OF THE DRAWINGS

Other aspect of the present invention and their advantages will be discerned after studying the Detailed Description in conjunction with the accompanying drawings in which:

FIG. 1 shows a block diagram of system for prioritizing displays of surveillance system.

FIG. 2 shows a flow chart of process for prioritizing displays of surveillance system.

FIG. 3 shows a flow chart of process for updating priority in the prioritizer.

FIG. 4 shows a flow chart of process for resizing display in said prioritizer.

FIG. 5-A shows an example of display arrangement for five camera displays being positioned according to their geographical locations.

FIG. 5-B shows an example of display arrangement with changing of size for camera displays due to the fire event detected at Camera C.

5. DETAILED DESCRIPTION OF THE DRAWINGS

In the following detailed description, numerous specific details are set forth in order to provide a thorough understanding of the invention. However, it will be understood by those or ordinary skill in the art that the invention may be practised without these specific details. In other instances,

well known methods, procedures and/ or components have not been described in detail so as not to obscure the invention.

The invention will be more clearly understood from the following description of the embodiments thereof, given by way of example only with reference to the accompanying drawings which are not drawn to scale.

Referring now to FIG. 1, there is shown a block diagram of system for prioritizing displays of surveillance system which comprises of a plurality of image capturing device (110), at least one data processing unit (130) which comprises of at least one data acquisition unit (120) and at least one prioritizer (140), and at least one display means (150). Said image capturing device (110) includes an internet protocol camera or any suitable digital video camera which is installed at predefined areas for surveillance purposes. Said plurality of image capturing device (110) is connected to said data acquisition unit (120) by connecting wires such as Ethernet cables for acquiring of video and / or audio data from said image capturing device (110). The acquired data is then transferred to said data processing unit (130) which contains processing algorithms to organize and analyse said acquired data. If an event is detected by said image capturing device (110), said prioritizer (140) is activated by said data processing unit (130) for managing prioritization with respect to any applicable attributes before said acquired

data from said image capturing device (110) is displayed on said display means (150).

Referring now to FIG. 2, there is shown a flow chart of process for prioritizing displays of surveillance system of the present invention. The process begins with interpreting the image capturing device (110) locations (210) from a configuration file, whereby said configuration file contains information of the image capturing device (110) locations which has been included by user before the process begins. Each of said image capturing device (110) is pre-assigned with an initial priority value with equal weightage for each of said image capturing device (110). Said initial priority value is used to determine the display size of the acquired image from said image capturing device (110). For example, if there are total of ten image capturing devices to be used, each of said image capturing device is assigned with an initial priority value of 0.1, which also means that the image size from each of said image capturing device (110) are equally same. This is followed by said data acquisition unit (120) acquiring images (220) and transferring said acquired images to data processing unit (130) for further processing (230). If no event is detected, said data processing unit (130) will transmit said acquired images to be displayed on said display means (150) such as monitor (250). If a predetermined event is detected, said prioritizer (140) will be activated for managing the prioritization of displaying the

acquired images (240). The operation of said prioritizer (140) typically comprises the step of updating priority and the step of resizing display which will be described below.

Referring now to FIG. 3, there is shown a flow chart of process for updating priority in said prioritizer (140) of the present invention. As each of said image capturing device (110) is pre-assigned with an initial priority value with equal weightage, the image size acquired from each of said image capturing device (110) which to be displayed on said display means (150) are equally same. Thus, it can be assumed that the size of image displays is proportional to the priority value assigned to each of said image capturing device (110). The larger the priority value, the bigger the display size and hence the higher level of attention is obtained for the acquired image. The process of updating priority in said prioritizer (140) is to update the priority value of each image capturing device (110). The factors which shall be taken into account when computing the priority value includes event type, proximity of image capturing device and event history.

For event type, there are many types of events such as intrusion, fire, object removal and so on. Each event type is assigned a priority value between 0 and 1. For those life threatening or dangerous event such as fire, higher priority value is assigned in order to have higher level of attention. For example, fire can be assigned with a priority value of 0.7. For proximity

of image capturing device, if a suspicious activity is detected in Camera A, the likelihood or possibility for said activity to be captured by the neighbouring cameras are higher compared to others. For example, those cameras which are located within 10 meters from the Camera A can be defined as neighbouring cameras, whereby such information has been incorporated in the configuration file by user prior to application. If said neighbouring cameras are assigned a 50% of the event type value, the obtained priority value for said neighbouring cameras is 0.35 for fire event. Therefore, Camera A and its neighbouring cameras are assigned with higher priority value for more attention compared to other cameras. For event history, more attention will be given to the camera that has received more events. For example, if Camera B received 10 events in the past and Camera C received 20 events in the past, Camera C shall be given higher priority.

As shown in FIG. 3, the process of updating priority begins with retrieving the initial priority value of the particular camera (311) when an event is received by said prioritizer (140). This is followed by identifying the value pre-assigned to that event type in order to add said value to the retrieved value (313). The third step in the process of updating priority involves searching for cameras in the neighbourhood, retrieving their priority values and adding a percentage of the event type value to each one of them (315). Said individual priority values are then proceed for

normalization (317). Said normalization process can be carried out by adding all the priority values and dividing each of said individual priority value by the total to obtain a new individual priority value for each camera. Thus, the sum of all the priority values are maintained at value of below 1. The obtained normalized value is then transferred to resizing display process for resizing the image displays at display means (150).

Referring now to FIG. 4, there is shown a flow chart of process for resizing display in said prioritizer (140) of the present invention. Said process for resizing display begins by obtaining all camera priority values after normalization (411), followed by resizing the image displays based on the new camera priority values (413). Background colour or highlight of the image displays can be applied based on the priority value in order to gain more attention to the user (415). For example, if the priority value exceeds the danger threshold, i.e. 0.7, the background colour of the image displays can be changed to red in colour.

Referring now to FIG. 5-A, there is shown an example of display arrangement for five camera displays being positioned according to their geographical locations. Assumes that Camera A, B, D and E are not attached with any data processing unit (130) and Camera C runs fire detection. As fire is detected in Camera C, said data processing units (130) transmit the fire event to said prioritizer (140). Said prioritizer (140) will update prioirity

value for said camera according to the event received and followed by resizing the image displays accordingly. FIG. 5-B shows an example of display arrangement with changing of size for image displays due to the fire event detected at Camera C. The priority value of Camera C has exceeded the danger threshold, i.e. 0.7 after receiving several fire events. As a result, the background colour changed from invisible to red. Camera B does not receive any event because it is not attached to said data processing units (130). However, said prioritizer (140) still increased its priority value due to its proximity to Camera C. Therefore, the display for Camera B is also bigger than others. The other cameras, i.e. Camera A, D and E are smaller than their initial size due to the normalization effect. Thus, said prioritizer (140) has achieved its objective which is to gain more attention to cameras with suspicious activity and at the same time to reduce attention to other cameras.

While the preferred embodiment of the present invention and its advantages has been disclosed in the above Detailed Description, the invention is not limited thereto but only by the scope of the appended claim.

WHAT IS CLAIMED IS:

1. A method for prioritizing displays of surveillance system, comprising the steps of:

i. acquiring image data from plurality of image capturing device by at least one data acquisition unit (220);

ii. processing said acquired image by using at least one data processing unit (230);

iii. displaying said acquired image on at least one display means (250);

characterized in that before said step of displaying said acquired image, comprising step of using at least one prioritizer to prioritize said acquired image data by updating the priority value of said acquired image data and resizing the display on said display means;

wherein each of said plurality of image capturing device is pre-assigned with an initial priority value and each of said initial priority value has equal weightage.

2. A method for prioritizing displays of surveillance system as claimed in Claim 1 wherein said step of using at least one prioritizer to prioritize said acquired image data by updating the priority value of said acquired image data and resizing the display comprises of the following steps:

i. retrieving the initial priority value of said image capturing device (311);

ii. identifying the value pre-assigned to the event type and updating said value to said retrieved priority value (313);

iii. further updating the priority of the neighbouring image capturing device based on proximity (315);

iv. normalizing all the priority values (317);

v. retrieving all the priority values of image capturing devices after normalization (411);

vi. resizing the image displays based on the normalized priority values (413).

3. A method for prioritizing displays of surveillance system as claimed in Claim 2 further comprising step of applying background

colour or highlight based on said normalized priority values (415) after said step of resizing the image displays to gain user's attention.

4. A method for prioritizing displays of surveillance system as claimed in Claim 1 wherein the factors which shall be taken into account when computing the priority value includes event type, proximity of image capturing device and event history.

5. A method for prioritizing displays of surveillance system as claimed in Claim 1 wherein said prioritizer (140) is activated when an event is detected.

6. A system for prioritizing displays of surveillance system comprising

a plurality of image capturing device (110);

at least one data processing unit (130) comprises of at least one data acquisition unit (120) to acquire image data from said image capturing device (110);

at least one display means (150);

characterized in that said data processing unit (130) further comprises of at least one prioritizer (140); wherein said prioritizer (140) is activated by said data processing unit (130) for managing prioritization when an event is detected by said image capturing device (110) before said acquired image data from said image capturing device (110) is displayed on said display means (150).

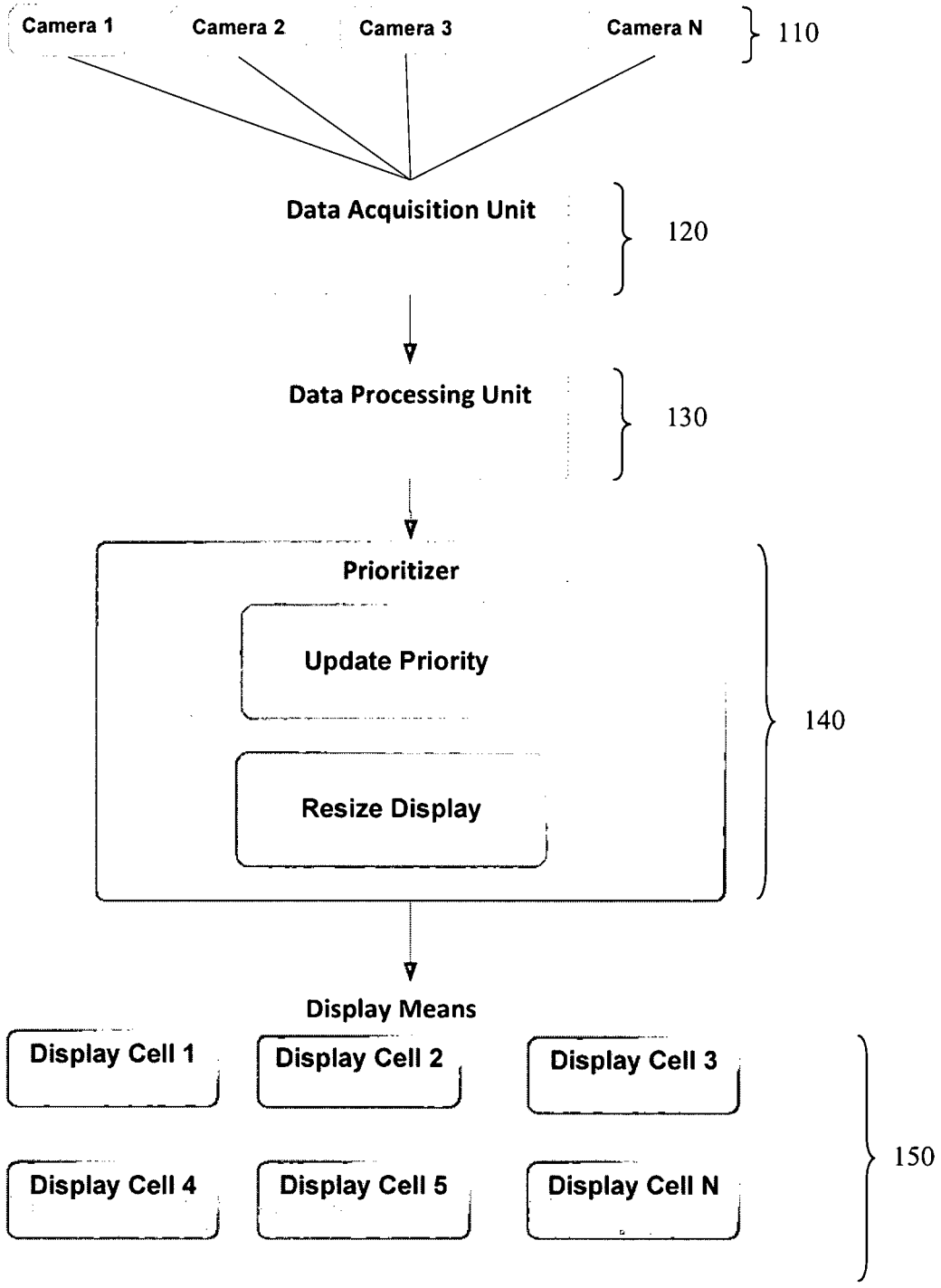

Camera 1
Camera 2
Camera 3
Camera N
110
Data Acquisition Unit
120
Data Processing Unit
130
Prioritizer
Update Priority
Resize Display
140
Display Means
Display Cell 1
Display Cell 2
Display Cell 3
Display Cell 4
Display Cell 5
Display Cell N
150

FIG. 1

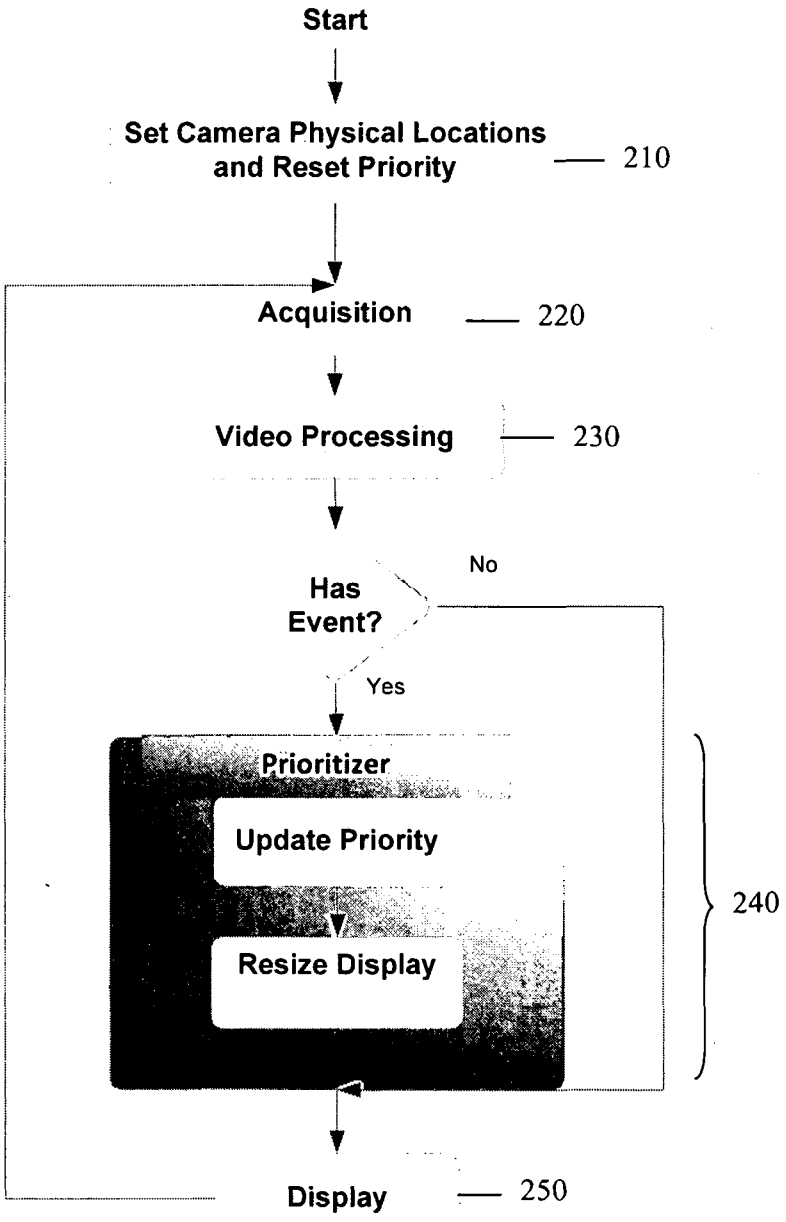

Start
Set Camera Physical Locations and Reset Priority
210
Acquisition
220
Video Processing
230
Has Event?
No
Yes
Prioritizer
Update Priority
Resize Display
240
Display
250

FIG. 2

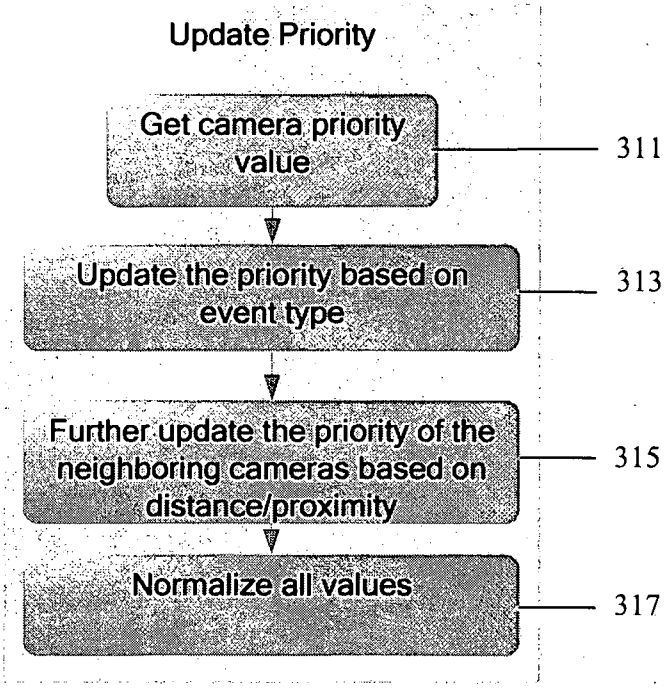

Update Priority
Get camera priority value
311
Update the priority based on event type
313
Further update the priority of the neighboring cameras based on distance/proximity
315
Normalize all values
317

FIG. 3

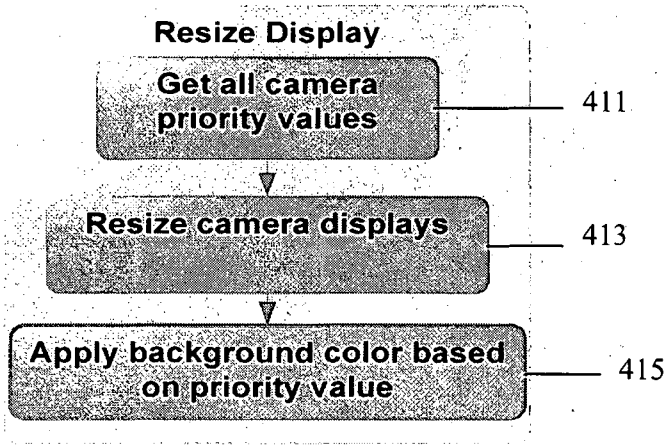

Resize Display
Get all camera priority values
411
Resize camera displays
413
Apply background color based on priority value
415

FIG. 4

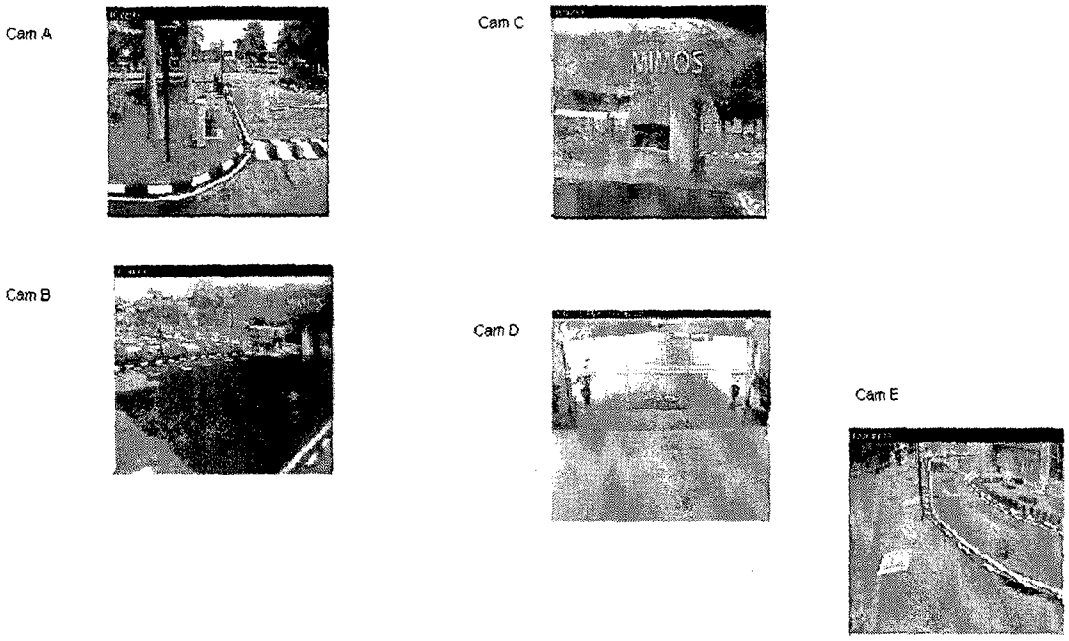

Cam A
Cam C
MIMOS
Cam B
Cam D
Cam E

FIG. 5-A

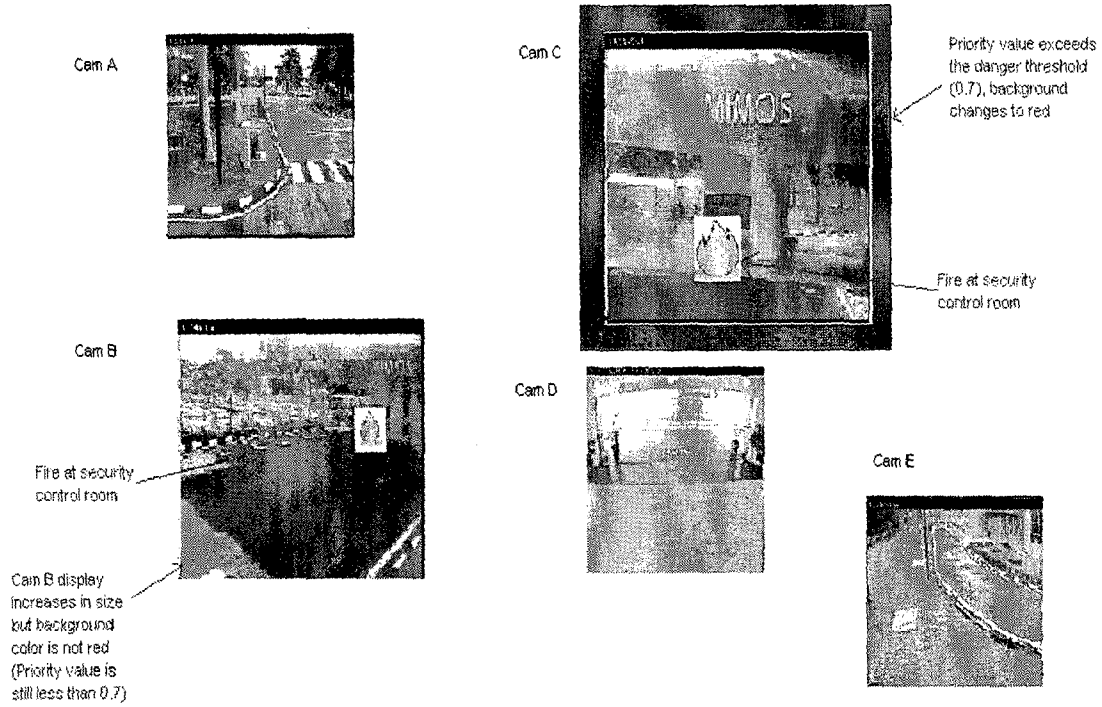

Cam A
Cam C
Priority value exceeds the danger threshold (0.7), background changes to red
MIMOS
Fire at security control room
Cam B
Cam D
Fire at security control room
Cam E
Cam B display increases in size but background color is not red (Priority value is still less than 0.7)

FIG. 5-B

INTERNATIONAL SEARCH REPORT

International application No
PCT/MY2012/000193

A. CLASSIFICATION OF SUBJECT MATTER
INV. G08B13/196
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G08B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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X	WO 2005/050582 A2 (INTERGRAPH SOFTWARE TECH CO [US]; GRINDSTAFF GENE A [US]; WHITAKER SHE) 2 June 2005 (2005-06-02) page 7, lines 7-12 page 7, lines 28-30 page 14, lines 3-9	1-6

-/- .

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

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"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
2 October 2012	09/10/2012

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	de la Cruz Valera, D

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INTERNATIONAL SEARCH REPORT

International application No
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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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X	WO 96/31984 A1 (WASHINO KINYA [US]) 10 October 1996 (1996-10-10) page 5, lines 21-30 page 12, line 30 - page 13, line 5 page 17, line 13 - page 18, line 12	1,2,4-6
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Information on patent family members

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