Saving Data Base Memory in Surveillance Camera by Real Time Motion Detection

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***Abstract*:- This is a security system that invokes the use of motion detection as a security measure.It uses the webcam as video source, threshold the frames, confirm if there is motion, then it triggers the video recorder.It compresses the video so as to reduce the memory consumption and records it bit by bit so as to differentiate the time easily.The system also triggers an alarm system to give alert of intrusion in the area under surveillance.The webcam is built in, but one can also use a detachable webcam as the video source and can disguise the camera using extension cables to deceive intruders.The prototype development methodology was used in the development of the system and MATLAB Programming was used as the programming language.The system is designing to make sure all the requirements are met and are working perfectly as expected.**

Key Words: Motion Detection, Security system, Data saving.

1. INTRODUCTION

As early as 1965, police forces of many countries around the globe implemented the use of surveillance cameras in public areas. The simple closed circuit television (CCTV) monitoring embarks the beginning of surveillance in videos. By the time videocassette recorders were available, the world was conversant with the concept of video surveillance. This system is an application developed to enhance security, using motion detection as a way of advancing the current surveillance systems. This system uses a webcam to get the video, and then compares the current captured frame with the previous frame to verify if there is motion in the area being secured. Upon confirming presence of motion, the system starts saving frames of the video.

Furthermore, the video streams are compressed so as to reduce the memory consumption of surveillance systems. The streams are recorded in small rates, so as to simplify the tracking of events and exact place from where the intrusion occurred. The recorded videos can further be processed, i.e., converted to any other format. Consequently, the system is also developed to reduce the cost of security so that there is no extra hardware required for this system to work. It is a standalone system and it uses the webcam, thus, no additional measures required.

2. PROBLEM STATEMENT & DESCRIPTION

CCTV enhances security but is expensive from the installation up to the maintenance and analysis. Monitoring and searching for a particular event or a clip is labor intensive as it requires concentration and focus, going through hours and hours, or even days, of recordings. Moreover, as the recorded scenes are continuous, it keeps consuming space, which increases the cost of maintenance, cost of tape or storage medium, technician labor fee, and so on.

Furthermore, time is needed to keep watch of the activities going on via the screen. Something may be happening but due to negligence and human errors it may pass by without been noticed, until something happens. Then the search will begin without any idea of where to start searching with lots of videos to go through. As such, much attention and concentration is required to avoid missing important and significant activities.

3. MOTION DETECTION

Motion Detection, as the key component of the system, is the measurement of the modification in rate or vector of an item. There are various methods in which motion could be detected, some of which are:

3.1 Mechanical Motion Detection.
3.2 Electrical Motion Detection.

*3.1 Mechanical Motion Detection:*Itis a method employing a simple mechanism, which involves physical interaction with the detection device. The object must come

in contact with the detector, a simple example, is the trip wire. Once anything touches the wire, it will sound an alarm or trigger the assigned task.

3.2 Electrical Motion Detection:- In this devices quantify and measure changes in the given environment. The foremost ways by which movement could be electronically recognized are acoustical and optical recognition. Some device that can be used for optical MD is the infrared light or laser technology the sensors fall under this category which is where the system to be developed lies.

4. MOTION DETECTION ALGORITHMS

Motion detection algorithm refers to the approach or procedure in which the actual detection is made, how the system verifies the presence of motion, which in other words can be said to be the steps in which motion is been detected. They are the support for an extensive variety in computer vision such as visual surveillance, recognition and tracking of objects and clamping streams. If it is faulty, the whole system will not run well and the main objective not achieved.

There are four types of algorithms as follows
4.1 Thresholding
4.2 Layer Extraction
4.3 Background Modelling and Subtraction
4.4 Saliency based Algorithm

4.1 Thresholding: This compares the current frame with the previous frame. It is adaptive to moving camera applications as distinctive protests and movements give diverse qualities of force that are not constant on the whole image. The verification is done separately on every pixel or on minor hinders of pixels to detect the presence of motion. It is easy to implement value, though it has some limitation as it produces false alarm, caused as a result of false detection due to noise.

*4.2 Layer Extraction Method***:** In this algorithm the pixels are compared with a model, where the models are like prototypes, similar to the background extraction. But in this case when the frame is captured it is disintegrated then compared to the models (layers) to locate where it belongs to. It then spots the difference in the layers. This method is suitable for both moving and static cameras.

4.3 Background Modelling and Subtraction: This algorithm also employs the comparison between the two frames as most other algorithms, of moving (forefront) protest is recognized by contrasting the present visualization and the static grounding of the scene. The main challenge for the algorithm is acquisition of background image, as the underpinning picture might not be static. It is the most common approach for MD with static cameras in surveillance systems.

4.4 Saliency based Algorithm: Unlike other methods, this approach defines moving objects as a field with salient motion, it detects the salient object. This approach basically focuses on a surveillance target, like to track a vehicle or human etc. For example, the radar is more focused on tracking. The point here is that an item with remarkable movement moves in an estimated unwavering course throughout a time period. Consequently, moving objects sought as restricted image area that have moved in the same route throughout a time period.

5. IMPLEMENTING METHODOLOGY

5.1 Planning

In this phase, the processing required for the development of Motion detection was done. A forecast of the outcome is also predicted to make further coordination for the system development. Moreover, most possible programming languages with ability to deliver the system were taken into consideration, e.g., Vb.Net, Java, Matlab, C++. The economic and technical feasibility of the system were also considered in this phase.

5.2 Analysis

This is the step where specific resources are identified. The specific programming language is chosen, that is, MATLAB, due to familiarity with the language and its flexibility which is appropriate in the development of the system. Other resources like memory, power, and the time required were also analyzed and reviewed.

5.3 Design

Prototype design is made in correspondence to the system requirements. A rough prototype is designed so as to clarify and get more details about the system, to compare and contrast various designs for the system. The model of the system is put forward.

5.4 Implementation

Designed prototype ready for implementation. The coding is concurrent with the specified design i.e., the motion detection, selecting the video source and such. This system is developed to give users to test, and after the test, the requirements for the system are reviewed.

6. ARCHITECTURE OF THE SYSTEM

There are basically three sub-functions carried out sequentially to do the functions expected of the system which are:

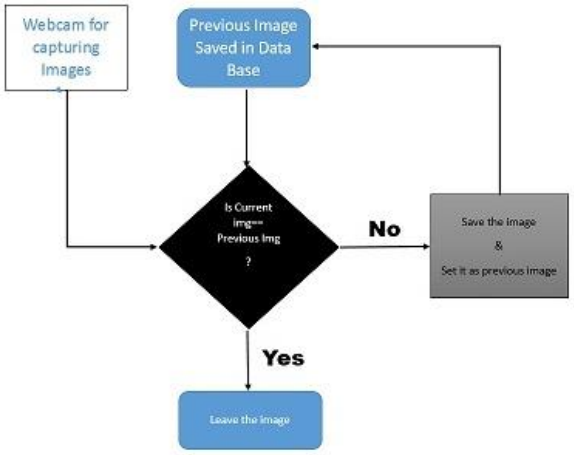
6.1 Capturing: Accomplished using a web cam (WC) that ceaselessly gives a sequence of video frames withparticular speed of FPS (frames per second). To detect motion, the system initially has to capture livevideo frames of the scene and region under surveillance.

6.2 Comparison of Frames: This stage is for checking if there is motion from the live feed captured. To do so,the system compares the frames obtained through the WC with

one another in order to detect variation inthe frames and sequentially exert the presence of motion. On confirming presence of motion, it is time forthe next step to carry on.

6.3 Storing the frames: If motion is detected the next action expected of the system is to store this kindmotion for the client viewing later. This helps the user in that he can provide a legitimate confirmation incase of any inappropriate action, since the video footage can be utilized as evidence to the authorities,police and even in courts of law.

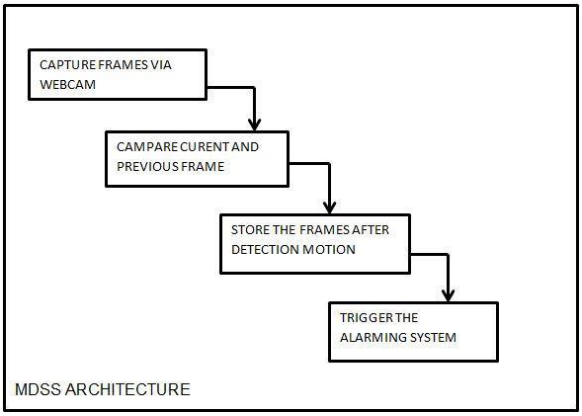
7.BLOCK DIAGRAM



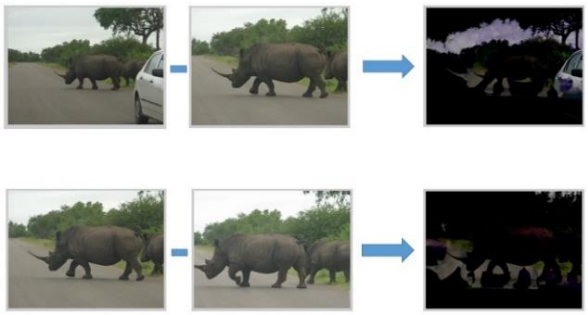
8. STRENGTH OF THE SYSTEM

The main strength of the system, which is more advantageous than the current systems, is to save the video clip to the storage media when motion is detected. Other existing systems just save video or capture images indiscriminately. Some systems detect and set off alarm, others detect and notify the user, but this system can do both.

The architecture is as follows



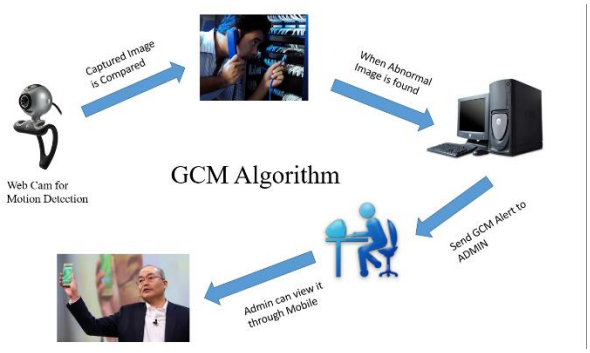
9. EXPERIMENTAL RESULTS



10. FUTURE ENHANCEMENTS

The system may be embedded with a computer BIOS. With this, the system needs no power supply, and it is guaranteed to run anytime. The user can link the system to a scheduler program to run at a specific time that he desires. The scheduler will automatically start the application at that particular time. The BIOS usually has a 3-year warranty giving an assurance of the longevity of the system's performance.

We can use GCM(Google Cloud Messaging) and get a message whenever the detection is occurred.



11. CONCLUSION

The study has established that the MDSS would require less resources for it to work as expected because of the motion detection principle. The system will only record when it detects motion, thereby, avoiding storage of unnecessary "dead air" clips. This system will also alarm and notifies the operator of motion so that he will be aware of an activity in the site being secured.

The system is successfully and completely implemented. Therefore, at this stage the system is ready for the end users to start operating. The user's manual can be prepared which is sufficient to give user full instructions of how to use the system.

In comparison with the current application of related features, such as the Spy Cam, baby cam, Level 2 multi camera application, camera Bison, and even with the most popular CCTV, this system stands a chance in the market, as it is more flexible, and gives a better management opportunity than the current market

applications. Its features, like the video compression, and detecting motion before it starts recording footage, put it at a better leverage than other systems.

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