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Motion and Alert System for Raw Video Summarization Based on Camera

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ABSTRACT: Close Circuit Television Camera (CCTV) has played very important role in many surveillance and security systems. However, such system requires continuous monitoring by human and hence there is possibility of failure because of boredom or fatigue. Even today no one has that much time to watch entire video to notify the intrusion. This paper gives the survey of techniques used by the researcher to prevent crime by judging the situation and abstract view of the proposed system that we are going to implement to detect the intrusion by comparing image and to provides video summarization facility to reduce the video watching time. The proposed system can greatly reduce the monitoring efforts by presenting an abstract view of entire video within a short period of time. Again this system gives alert to the admin in case any intrusion occurs by analyzing the behavioural patterns of the objects.

KEYWORDS: Close Circuit Television Camera (CCTV), Video surveillance System, Intrusion Detection, Motion Detection, Background Subtraction, Video Summarization.

I. INTRODUCTION

Nowadays security is a most important issue arising due to an increase in criminal acts such as child-related sexual offenses or commonplace criminal acts, to protect residents in places, and places that require high security like bank lockers, ATM centers, museum, and other care facilities. Video surveillance [1] [14][15] systems have been widely used as a common activity monitoring system around the World. Video surveillance is an important application that helps in monitoring different areas which require high security, thus video surveillance is a very important concept which plays a vital role in safety and security. The video surveillance system is used in detecting, analyzing, and tracking any unusual activity also it is used for public safety and other high security needed areas. The installation of the CCTV [5] helps prevent crime and may aid in the solution of cases. Its role is also increasing in various forms. The most important technique of this smart CCTV related research is to track and analyze objects within the images. Motion Detection and Video Surveillance System Using an IP camera is a system that helps in analyzing and tracking the objects and taking the required action accordingly. This System helps in providing security which reduces the human need and reduces labour. The System is best suited for indoor security as we are monitoring a particularly high-security area.

Motion Detection and Video Surveillance System Using an IP camera is a System that helps in keeping the record of the activities and tracking the records whenever required. The goal of our system is to provide affordable and quality surveillance system to every user. A most important feature of this System is to detect intrusion [15] within the real-time image frames and notify the user/administrator if intrusion found. In this System, we use a combination of various methods to detect objects in real-time video frames. In this surveillance system, we have improved the performance and accuracy of detecting the motion of the object as compared to the existing system.

For video summarization [1][5], various approaches have been implemented for achieving the same goal, which can be used to help us ignore unimportant information like space and time. The early technique called frame skipped or video skimming, where several frames are skipping according to a user's needs such as an object, color, motion, etc. Adaptive video fast-forwarding was developed on the intention to adjust the playback speed of the video, which results

in the details of the contents to be shown on the normal speed while the high speed applied on the rest. An entire frame is a key for summarizing in both video skimming and adaptive video fast-forwarding. Another key summarizing is a spatial dimension.

II. RELATED WORK

The system represents a surveillance system to capture camera images and detect intrusion using comparison - block-based motion object detection method [13] and if any mismatch occurs then the message is sent to the admin. The system can detect motion by using BSM technology from video then crop this video and add it into the new summarized video.

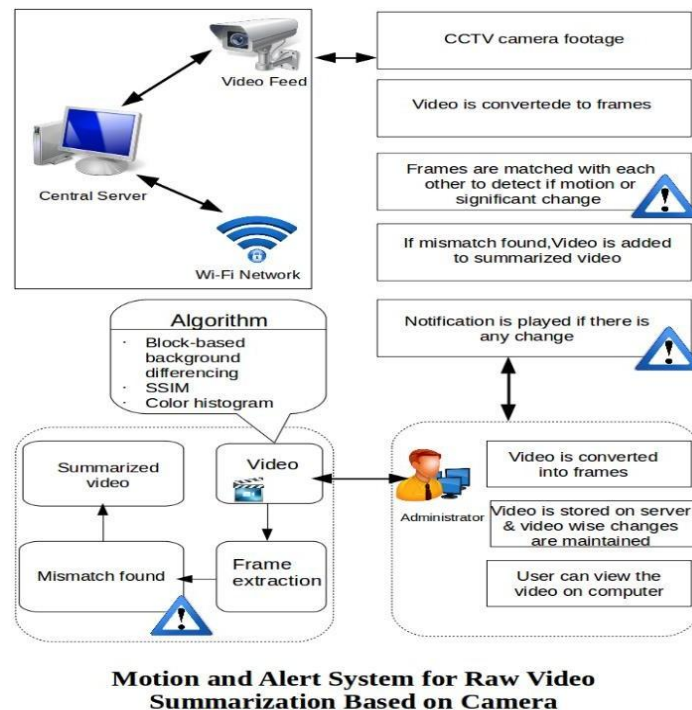


Figure 1 : System Architecture.

This project makes use of OpenCV library to capture camera images and detect intrusion using comparison - block based motion object detection method. Once the comparison is done and an intrusion is found, it sends the streamed video from server to administrator computer. Admin can then take appropriate action and alert local security.

Administrator can control the remote cameras using following features:

- Image Comparison and Intrusion detection comparison- block based motion object detection method.
- The system plays an alarm after detecting intrusion.
- The system keeps track/log of all the activities. Hence detailed record of messages received is maintained, also a detailed track of all the activities (intrusion detection, etc.) is also maintained

System Modules:

1. Capture Image

Input: Camera ID
Output: Captured Image



In this module by providing camera ID we will get image as output.

2. Capture Video

Input: Camera ID

Output: Captured Video

In this module by providing camera ID we will get video as output.

3. Compare Image

Input: Captured Image

Output: Difference in capture image and template image.

In this module we will get difference in captured image and template image.

4. Video summarization

Input: Video

Output: Detect motion from video then crop this video and add into new summarized video.

III. METHODOLOGY

➤ **Algorithms Used:**

1. Block based background subtraction(SqrDiff):

-It is used for subtracting current frame image and the background image

2. Structural Similarity Index (SSIM):

-SSIM is used for measuring the similarity between two images.

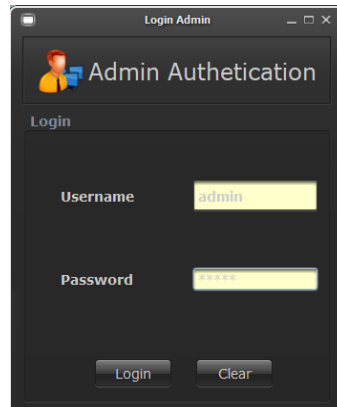
3. Color histogram:

-It represents distribution of colours in an image and compares histograms of two images.

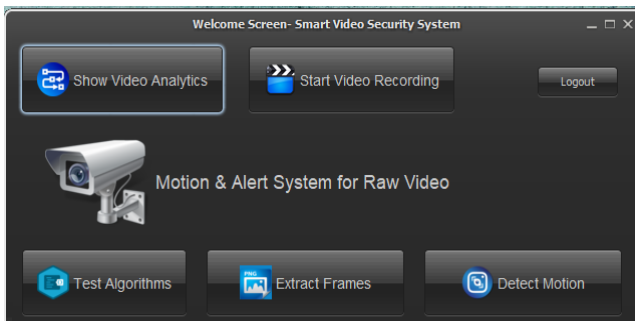
<i>Algorithm</i>	<i>Threshold</i>	<i>Output</i>
SqrDiff	Threshold > 200	Mismatch
SSIM	Threshold > 0.98	Mismatch
Color Histogram Bhattacharya technique	Threshold > 0.02	Mismatch
Color Histogram CV_COMP_CORREL	Threshold < 0.998	Mismatch

IV. EXPERIMENTAL RESULTS

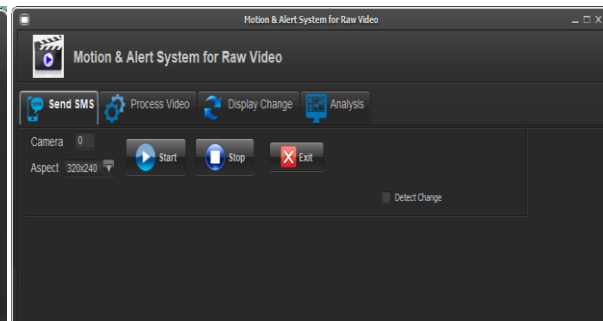
Figs show that: (a) Login Page for admin (b) Home page for video capturing and processing (c) Video Processing and SMS sending (d) Forming Video (e) Detecting the intrusion and showing the message



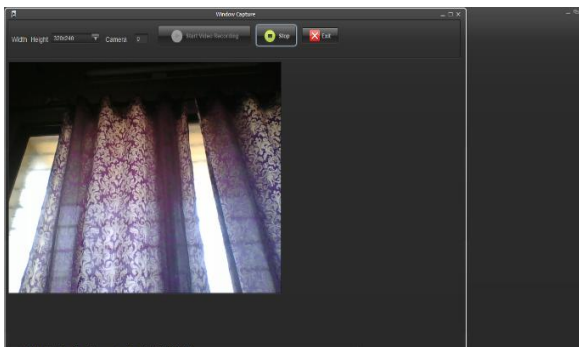
(a)Login



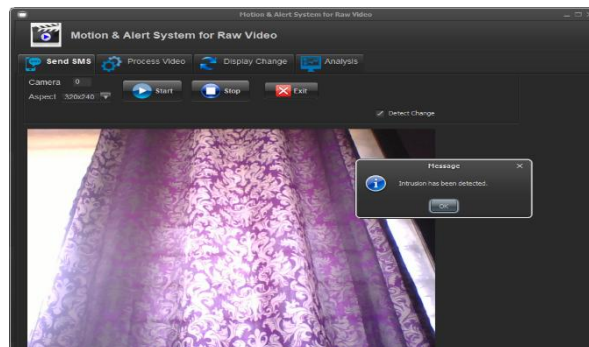
(b) Home



(c) Processing



(d) Video form

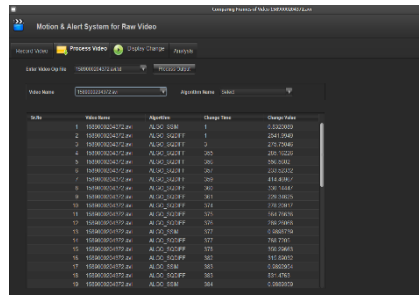


(e) Intrusion Detection Message

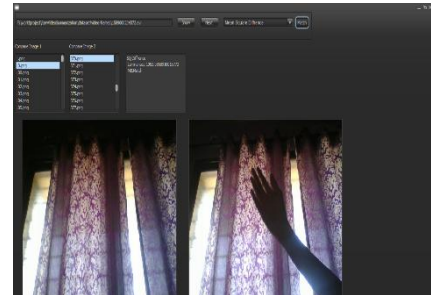
Figs show that: (a) Frame extraction of captured video into images (b) Video change detection by using different algorithms (c) Result with three different algorithms i.e Square difference, SSIM, colour histogram (d) Displaying the change in video (e) Analysis with summarized video



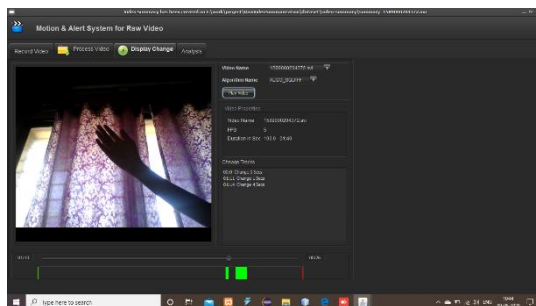
(a) Frame extraction



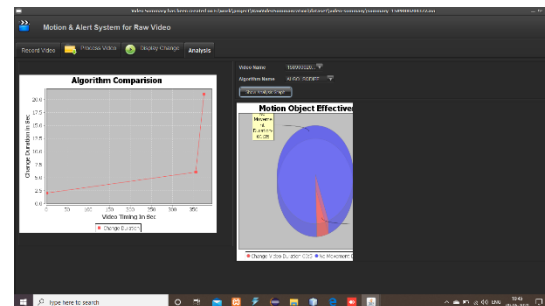
(b) Video Change Detection



(c) Algorithm Result



(d) Display Change



(e) Analysis

V. CONCLUSION

This paper gives the survey the different techniques used by the researcher for analyzing, and tracking the object’s motion to detect intrusion using CCTV.

CCTV is used in various places like in government areas, in government offices for security purposes. The presented system can judge the current situation by detecting motion in real-time by analyzing the behavioral patterns of the objects and their association with the surrounding environment. Detection of motion is essential to identify the activities performed by an object and record the activities performed by video recording.

This study intends to detect intrusion by analyzing, and tracking the object’s motion. The system can judge the current situation in real-time by analyzing the behavioral patterns of the objects. The system provides an additional facility i.e. summarization for reducing time to watch the recorded videos to monitor suspicious activity happening around that object. The admin can view live streaming [14].

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