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Real Time Video Surveillance System

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Abstract: *The embedded system and RTOS are reaching beyond the norms of innovations, the prospects of security and demanding protection against various threats has been widened immensely. This paper represents the most integrated and customized advanced Android based Real time Video Surveillance System in order to secure and protect what matter the most to the user. The main objective of this system is to monitor the area where the webcam is set up. The user will receive live notification if a motion is detected, if any unusual activity is identified, the user will be directly redirected to the emergency service number. The notification is done through Google Cloud Messaging. Our research focuses on the entire processing of the system.*
Keywords: *Webcam, Android, Real time monitoring, Surveillance, Cloud Storage, Alert notification.*

I. Introduction

Surveillance is analysing and thus monitoring of remote area for safety purposes is what real time video surveillance is all about. One of the reasons for increasing crime is the lack of security and various negligence that results to such incidents. For e.g. suppose a CCTV camera is set up in a jewellery shop,robbery takes place ,by the time it comes to the notice to the owner ,action taken against theft and collecting all evidence will be delayed Hence the reason for such incidents is the instability that are happening all around. Therefore there is a need of smart intelligence system for monitoring which captures the real time video, transmit the video directly to your phone where you can easily monitor. Also another advantage is that it offers privacy on both sides since it is being viewed by only one person.

Traditional video surveillance system, the CCTV is set up and the person can only view what is happening around that place. The benefit of our system is even if the person is moving around he can view the video at any point of time and place.He will also receive an alert notification if an intrusion is detected and will be redirected to the emergency service no.

Wireless video monitor system provide a feasible solution for remote wireless monitoring with low cost.It is the cheapest and commercially available option when comparing with other alternatives. Most of the IP cameras require high bandwidth thus is a major drawback. [1] So indeed low cost video acquisition units are to be developed. Here we are proposing a system which is developed using dot.net framework with the web camera which captures the real time video and displays the detected. This real time video can be seen to the on android mobile devices .Performance of the IP cameras are being judged with respect to its video resolution, power dissipation.

II. Literature Survey

In earlier system as it was not feasible enough because it include problem such as high cost, weak security, low intelligence, poor stability, In order to solve these problems, we adopted video surveillance system using the concept of two frame motion detector, combining android device. This paper has advantages such as higher intelligence, greater security, higher stability, and easy installation and disadvantage as it requires high cost and continuous requirement of network, if the network is not available will function improper and won't be able to display the exact results. In literature the properties of system its advantages are explained which uses an email notification and cloud to store data. The limitation of CCTV cameras is discussed in introduction while the in real time the systems provide a rapid response for intrusion detection and the prevention of any threat. Earlier remote image data is transferred to android device with wireless LAN but with limited distance constraint. The main principle of network remote video surveillance system based on is to set a server at the video surveillance terminal. The video signal should be encoded first, then compressed into a recognized video format and finally is saved on cloud storage which is send further on android device. The continuous monitoring of the videos is not required where the video frames were compared with a template image. While comparing the reference rate of current thread and previous threat based on the level of difference in threshold if any intrusion is detected then the authorized user is notified via GSM talks about performance evolution of webservice which alert the device. They operate autonomously in any unattended environments. And literature suggests system, it captures video, shared to the specific device and also alerts the controlling person with short email service.

III. The Study

Webcams are setup in order to stay secured and under protection .It is very important to use cameras in conjunction with alarm systems so that the proper authorities can be alerted.At some point monitoring the system becomes unmanageable as security is not feasible which will eventually consume more time and efforts [2]. It is very important to overcome this drawback .Since communication has by far turning so easy with the help of mobile technology.

IV. Proposed System

The main purpose of this system is to enhance the awareness of security collecting real-time information automatically. It is peer to peer technology. Data transfer between the system and the mobile is handled securely [3]. The system raises an alarm whenever any intrusion occurs or unacceptable movements are detected. Whenever a motion is identified the system detects and the video is saved on the server. The android device is notified when the video is saved over the server through and SMTP connection. It then fetches the video from the server and is displaced on the mobile phone to the end user. The process of sending and receiving video is done using SMTP connection at the both the ends that is at client and server side. At server side one background thread is continuously running which is responsible to be in loop. The database will store the videos according to their date and time. You will find the latest video on top. Currently, relatively simple authentication is provided, a more elaborate mechanism can be integrated, if required. Android being handy notification to phone is instant and easy to retrieve the video on user's phone.

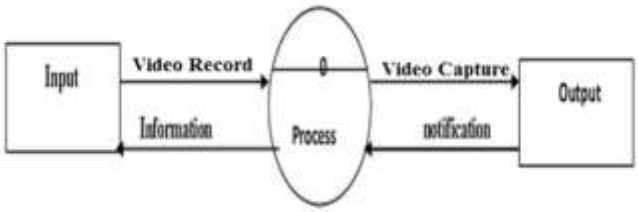


Fig. 4 Process Flow

Benefits of proposed system:-

1. Multiple scenario can be monitored at once.
2. Retrieval of video file on intrusion from cloud.
3. Mail alert each time the motion is detected to concerned user.
4. Extremely fast response time.
5. Based on real time
6. Instant notification

V. System Architecture

Our system is based on 3-tier architecture where mobile and system are considered as two peers of the network. On the application side consist of server device. The client side comprises android device application. The middle tier comprises the database server. The two device communicate with each other with the help of cloud server. The module on server side complete the task of tracking and capturing the video, image detection and video processing, encoding and transmission collaboratively. As the current system is a prototype the video file will be read from the webcam and display on the video box in the application. User can activate motion detection by simply clicking on the checkbox of motion detection system. When the server receives the connection request to starts recording the data of real-time through the web cam. Dot net framework put forward acknowledged libraries. Tracking the motion controlled by these libraries.Aforge library is an image processing library.

It processes the video and captures the frames.Image processing and libraries was developed to run on the .NETFramework and uses the System.Drawing assembly as basis for image manipulation and processing. [3].Once the motion is detected an event is triggered. The video is compressed into suitable format without degrading the quality of image. The captured video is stored in cloud database. Here we have used MySQL database. On the client side the web service calls the MySQL cloud database [4]. Web service retrieves the video and stores it in android application.

Video uploaded to the cloud server which can be referred by the user. On the event of motion detection a notification alert will be sent to concerned user. The video file can be retrieved by the user on his android phone. If any intrusion is detected user will be redirected to emergency service number else can ignore the alert message.

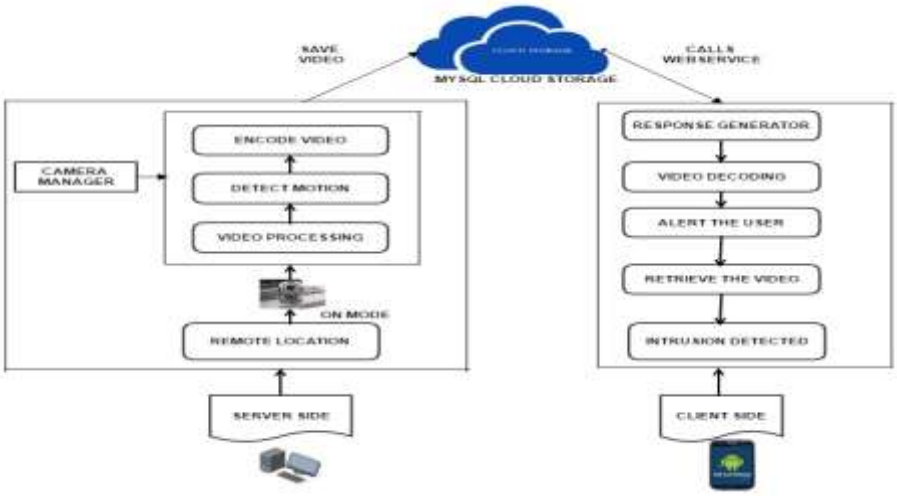


Fig. 5.1 System Architecture

VI. Flow of the System

The base of any video surveillance applications rely on tracking of the incoming video sequence and motion detection.Hence the movement of the object is identified accurately. [5]The application is developed using Asp.net using C# to capture the motion and android for retrieving the video to the authorized user's phone. The users enables the web cam, the camera starts recording the video, as soon as the motion is occurs it detects and captures the video .The frequency of the video is set by the threshold value. The value determines the accuracy of the moving object and alerts the system to capture the video. Once the video is captured it stores the video in cloud server.

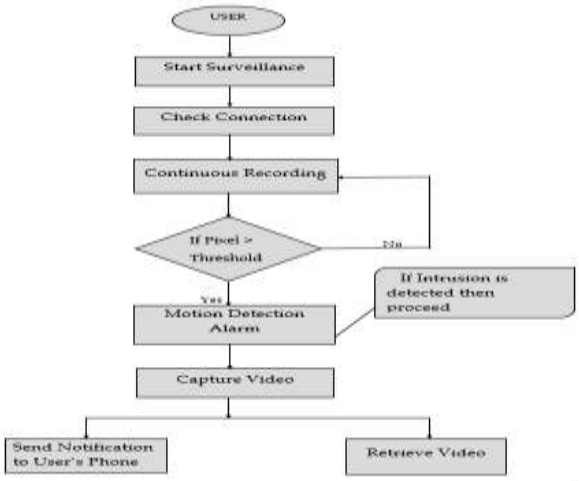


Fig. 6.1 Flow of proposed system

Now from here onwards android plays its role .An SMTP connection is set up between android and the system program. When the video is placed on cloud server, android calls the web service to access the video from the cloud server. After the motion is tracked an instant notification will be sent on concerned user's phone. The user can retrieved the video footage of the person triggering the motion on his\her android device. User will be using Android device for the retrieval of video from the remote place to know whether those alert are important and can be ignored. If an authorized person enters the concerned user can ignore the alert. If any intrusion is detected the user can directly redirect to the emergency service number from the app itself.

VII. To Frame Motion Detector Algorithm

The moving object detection research on video sequences, the moment of the people is tracked. [6]Using video surveillance the threshold value is calculated to find the moving image using frame algorithm. The moving frame is thenidentified by the threshold valuewhere the movement of the frame is identified and tracked. The frame rate, frame size, sampling rate is calculated per second todetermine the frequency range. An Index value is set to each one of them. We subtract one from index because the first item is none.

The timer tick handler is not required to make things work correctly; it's only there to record and calculate the frame rate you're getting. The work of notifying you of motion is performed in the "New Frame" event handler. I had a requirement where I had to process the frames of video at the same time when it is streaming (may be in a separate thread).Allowing them to be accessed from a thread other than the one they were created on. Wecreated the bitmap source on the background thread, freezing it, and then assigning it on the main thread.

Process

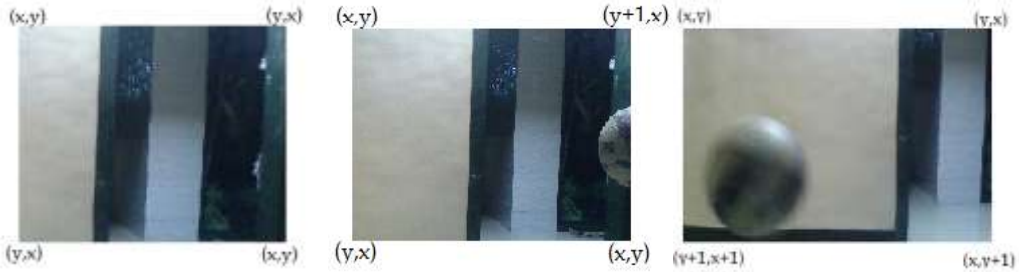
The image subtraction is calculated on the basis of reference rate. Three reference rate exist each one having fixed x and y coordinate axis directing to matrix formation. When the motion is detected, the x and y coordinated axis of current reference rate is compared by subtracting with the previous reference rate. The new coordinates of x and y axis is subtracted and if there is mass difference the motion is detected and captured.

Capture frame=Current frame- Reference frame } Frame Subtraction
Detect frame if difference>threshold

The two important functions played an important role in distinguishing the difference in frames.

- Twoframesdiffdetector ():-Does the image subtraction of the reference frame and current frame.
- Motionareahighlighting ():-This function highlights the motion area.

Fig. 7.1 System recording real time video



(2.a) (2.b) (2.c)

Fig. 7.2 Image Subtraction

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VIII. Conclusion

Presently, the surveillance systems used requires continuous human vigilance. [7]Our Smart video surveillance system contributes to situation awareness. Surveillance system through smart phones ensures more flexibility thus enhances the mobility of the user that reduces the workload of continuous human monitoring Real-time video analysis provides smart surveillance systems with the ability to respond in real-time. Our system detects the intrusion and sends notifications to authorized persons so that necessary action can be taken in response to the intrusion. . Moreover it will save memory as well as memory wastage would be avoided.This research will work as a great idea proposed for security based advance surveillance system.

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