

ANDROID VIDEO SURVEILLANCE USING MOTION TRACKING AND IMAGE PROCESSING

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ABSTRACT

Automated security systems are an important addition to video based security systems. Video security system though easy to setup has a lot of drawbacks. This paper proposes an Android integrated video security system, Which works on two platforms. The primary video surveillance and motion detection module helps with the preliminary intrusion detection. After the detection of motion an motion alert notification send to the concerned user. Several experiments and field tests conducted have shown good performance and feasible implementation in both subsystems.

1. INTRODUCTION

Surveillance is analysing and monitoring of remote area for security. Traditional video surveillance system such as the CCTV is set up to monitor the activities that are going on in a given location. The benefit of our system is even if the person is on the move he can view the video at any point of time and place. Therefore there is a need of smart intelligence system for monitoring which captures the real time video and transmit to the concerned user, Android video Surveillance system transmits the video directly to your phone where you can easily monitored. Here we are proposing a system which is developed using C# windows forms which captures the real time video and sends the Concerned user a notification if and when a motion is detected.

2. 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. Our system would have a motion detection unit which would be constantly monitoring the video

footage from the camera, video wont be recorded unless a motion is detected. As soon as the motion is detected fire based cloud notification messenger would fire a notification to the android app associated with the system.

The working system is divided into two layer:

- 1.Motion detection unit
- 2.Android frontend

3. MOTION DETECTION UNIT

This unit constantly monitors the video footage provided by the camera. The video is analysed frame by frame for any kind of intrusion. Sample frames are collected and used as reference for preceding frames to detect motion. The reference frame and the current frame is converted to matrix and subtracted, if the deviation from the subtraction is larger than the threshold value for motion detection then the system triggers a motion alert. As soon as the motion alert is triggered firebase cloud messenger send a notification to the user's Android app associated to the system. The motion detection unit then starts recording the footage of the intruder for several seconds. The recorded footage is thereby uploaded to the cloud.

4. ANDROID FRONTEND

This would be the frontend unit which the user or the administrator of the system would use. This android app which equipped with a motion detection unit's disabling and enabling module. It would also feature a call emergency services button to alert the security services in an event of intrusion by a malicious source. A QR code encoded with Administrators phone's IMEI number would be placed outside the room equipped with our system. The app would also have a inbuilt QR code reader which would then read the QR code outside the room and match the IMEI with the administrator's phone. If the QR code matches then the motion detection unit would be disabled. Thus the user can enter the room without triggering false alarm.

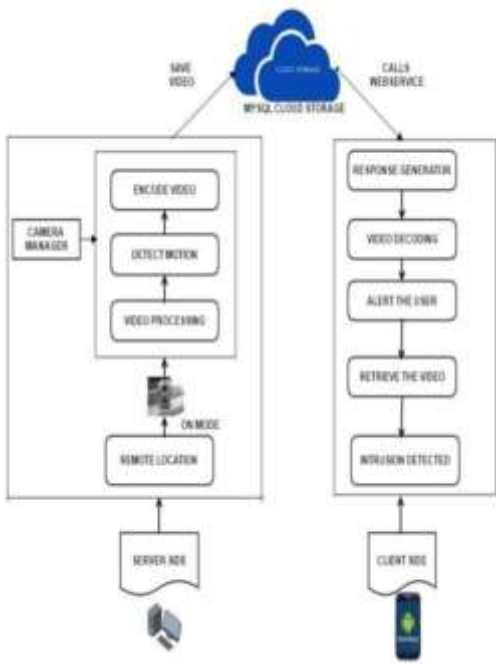


Figure 1

5. TWO FRAME MOTION DETECTOR ALGORITHM:

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.

Two frames diff detector() :- Motion area highlighting() :-

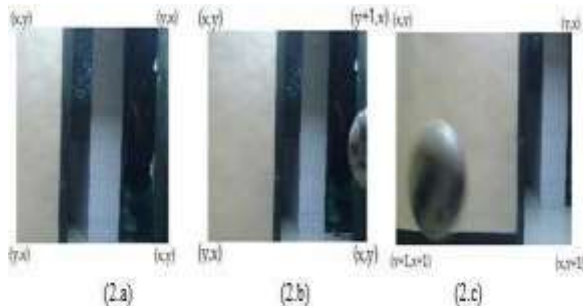


Figure 2

8. MAINTENANCE

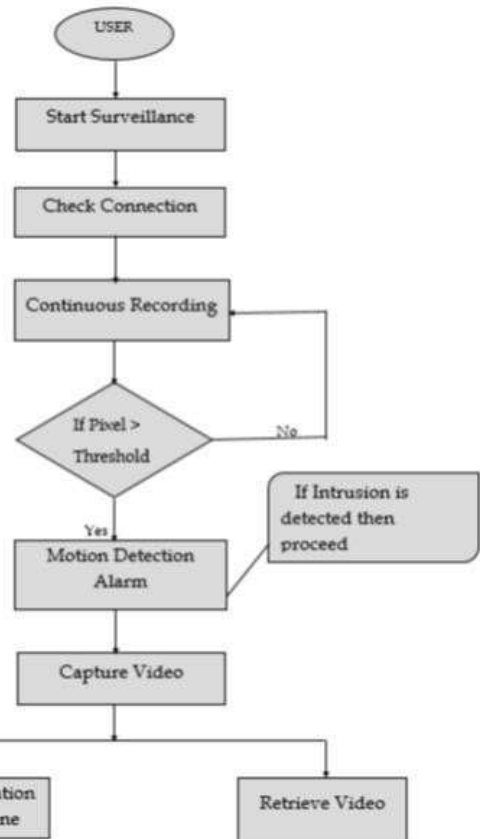


Figure 3

6. WHY IS THIS USEFUL?

In the existing CCTV video surveillance method constant monitoring of the video has to be done by an individual. Moreover, the video is recorded constantly taking up a lot of hard disk space and consumes a lot of resources. Our system does not need a person to constantly monitor the video footage and the video is recorded only when the motion is detected thereby drastically reducing the space needed to store the video and also significantly increasing the response time to reacts to a possible intrusion.

7. FUTURE SCOPE

When deploying this system on a commercial scale we can use centralized dedicated web servers to analysing multiple video footage at once and send alerts to the users simultaneously. Also with the further improvement in the field of image processing the motion detection module can be further enhanced. As the frontend is only Android in further IOS support can also be provided.

Maintenance has always been a matter of significance but often the most neglected one also. During the development phase the developer should design the system considering the ease

in the system maintenance at later stages. The system developed here is divided into modules, each module handling a different function are independent of each other. Hence it is easier to further add other functions if the need for the same arises.

9. SECURITY

- For authentication, the user is required to register himself for future access to the system. Every user can access only its own account.
- Log file is stored at server which stores log in and log out time of all the users.
- Currently, relatively simple authentication is provided, a more elaborate mechanism can be integrated, if required.
- Data are stored in Microsoft access database which do not provide any feature for access control. This additional feature may be incorporated in later stages.

9. CONCLUSION

Presently the video surveillance system needs constant human monitoring, our video surveillance system contributes to situation awareness. Surveillance system using Android phones ensures more flexibility and thus enhances the mobility of the user. Our system detects and notifies the user about the intrusion in less than 10 secs thus drastically increasing the response time to a possible intrusion. Moreover as the video is not being constantly recorded in the traditional video surveillance system large amount hard disk space needed to store the video is saved. Thus our system saves a lot of time and resources and drastically improve the security and reaction time to a possible intrusion.

10. REFERENCES

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