Intelligent Video Surveillance System for Banks

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Abstract—The paper proposes an Intelligent Video Based Surveillance System for motion detection in bank locker rooms. The system basically concern on the use of automatic motion detection technique using webcams for locker security. The system captures action triggered by motion as it happens. When an intrusion occurs the system will instantly send email notification with the image captured straight off to the security officer. The alert mechanism promptly triggers an audio clip alarm once motion is detected, and this facilitates the prevention of any sort of security breach at that instant.

Keywords—*Frame Comparison , Email Notification*

I.   INTRODUCTION

Security is one of the major concerns in banks, business enterprises, commercial outlets etc. Security has to be implemented in all the fields of the society such as detection of motion in radars for the defence purposes, home security systems, prevention of robberies in commercial institutions. Today bank robbing becomes common practice in the society. It is high time that a perfect solution has to be found out to put a stop to such malpractices. There should be no compromise in security implementation.

Bank lockers are used for keeping valuable assets of customers. There are various cases reported on the incidence of bank locker robberies. So an efficient monitoring system is a major concern. The existing video based surveillance system faces two problems-large amount of cost associated with continuous video recording and delay in reporting of robbery. The system uses a video analysis based on motion without the human interference to achieve detection, and alerting the concerned authority whenever a motion is detected. This system is conceivable in highly secured areas such as secret file sections, weapon storage, cell-block activity in prisons and bank lockers.

In this system, a new technique is introduced to use webcam and e-mail system for visual security purposes. The central software drives on Personal Computer, which acts between webcam and its controllable base. The Video Based Surveillance System is motion detection software that monitors the bank locker rooms. The system records action triggered by motion as it happens. When an intrusion occurs the system will instantly send email notification with the image captured straight off to the security officer. Here webcams are used to observe the locker room.

By performing frame comparisons motion is detected. For comparison process, a conversion has made from the RGB format to GRAY scale format. After comparison frames are retransformed to RBG format and then stored in the database. The conversion to GRAY scale is done to decrease the pixel values, whereas comparison is done pixel by pixel. The difference in frame gives only the moving objects on the frame. The system instantly sends an e-mail notification when motion has been detected by webcam. The security officer can view all event history along with photo snaps from within the system. For sending e-mail, SMTP protocol is used.

Rest of the paper is structured as follows, Section II contain the related works of this paper, Section III contain the methodology used in the proposed system, Section IV consists of results and discussion and Section V provides conclusion of research work with future directions.

II. RELATED WORK

In [1], the intended system uses detection to motion for intrusion detection. Cauchy distribution model is adopted for detection of motion which performs the comparison of existent frame in the prolonged sequence of video to the precedent frame, which is taken as the reference frame. Here, the user is notified with a GCM alert together with a custom sound.

In [2], the project aims at using a webcam attached to the computer for motion detection. These webcams acts as an eye towards detecting the motion when intrusion occurs. Frame are compared to identify the motion .Whenever an intrusion occurs in the range of the webcam coverage, frames are stored in specific location. The intended system also aimed at reducing the storage capacity of the system for different types of applications.

In [3], the project is developed to watch the area in which it is being implemented. The project uses a digital camera to catch the live images of the area in which it is being installed, if any object is moving and a transmitter will send the wireless signal to the receiver in the form of radio frequency

III. METHODOLOGY

The intended methodology consists of four major modules such as Authentication, Image capture, Alert system, and Image Storage. The intended system permits the administrator to login with username and password. The admin can also manage operations such as add customers, view customers, add branch details, view branch details, to acclaim or reject access locker request of the customers. The admin can also view the success and failed locker access details. Modules are as follows:

- Authentication
- Image capture
- Alert system
- Image Storage

1] Authentication
After authentication the admin can log in to the system. Admin can add, view or remove customers, branches. In this module, authentication operations are performed. Two passwords are required for the authentication. Two passwords are provided for the surveillance officer. The first password is safe password which provides the user permission to enter the bank locker. The second password is unsafe password and it is used to record the failed locker access if any problem takes place. When the surveillance officer enters his safe password, it indicates that the user is

valid and enables the user to enter the locker room. If the surveillance officer enters the unsafe password or if any attack from an external intruder occurs, then it will be considered as an invalid user or an intruder.

2] Image capture
A webcam is used to watch the locker room. The camera interfacing part consists of the list boxes where the list of all the camera devices connected to the software is displayed. By default the first camera is selected, but we can select any of the available devices from the list box. When a device is chosen, the camera is interfaced through coding part. The Webcam captures the images whenever motion is detected. For comparison process, a conversion has made from the RGB format to GRAY scale format. After comparison frames are retransformed to RBG format and then stored in the database. The conversion to GRAY scale is done to decrease the pixel values, whereas comparison is done pixel by pixel.

3] Alert system
In this module, webcam keeps watching over the bank locker room. The system will instantly send email notification with the image captured straight off to the security officer's mailbox straight away as motion /intrusion is detected. The security officer can view all event history along with recordings and photo snaps from within the system. When the movement is detected, attention of the security officer is required and may be needs to told instantly of an intrusion or suspicious movement detected in the region under observation. The alert mechanism promptly triggers an audio clip alarm once motion is detected, and this facilitates the prevention of any sort of security breach at that instant.

4] Image Storage
Images which are captured by the camera are stored in the database. The database can only be accessed by the admin. When a motion is recognized the next action of the system is to store the images of the intrusion occurred for further retrieval. This helps the user in providing a legitimate confirmation in case of any inappropriate action, since the video footage can be utilized as evidence to the authorities, police and even in courts of law.
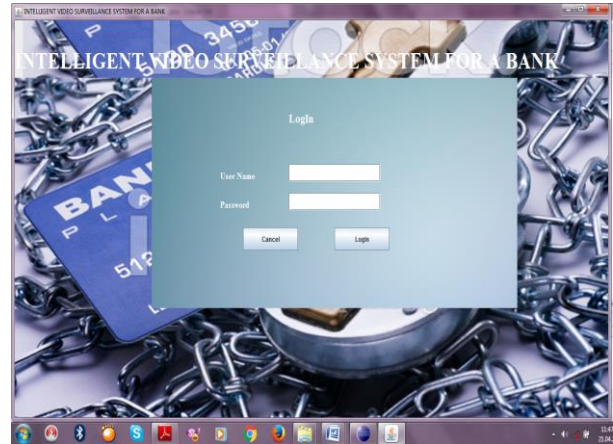
User enters
locker room

Start surveillance

Error
message if
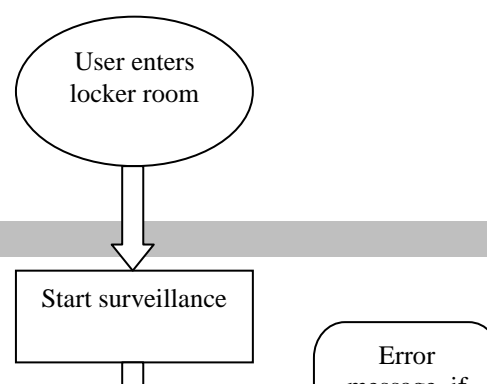
Figure 2. Login Page

B. Home page

After successful login, admin gets directed to a home page which has the various buttons that takes control to various pages related to customers and branches.

Figure 1. Alert sytem

IV.   RESULTS AND DISCUSSION

A. Login page

Here the admin needs to perform Login activity. Login page shown in Figure 2 provides a Login interface to the admin. When the admin enters his username and his password, the system performs validation to check whether the entered username and password is valid or not. If the entered username or password is wrong then system gives an error message. And if it is correct then admin gets directed to home page with successful login.

Figure 3. Home Page

C. Motion detection

Here, detection of motion is accomplished using a web cam. It gives the consecutive video frames with certain speed of FPS (frames per second). When the movement is detected, attention of the security officer is required and wants to be informed instantly of an intrusion or suspicious movement detected in the region under observation, and thus, a notification is send via email together with the image of the detected scene to the security officer. The alert mechanism promptly triggers an audio clip alarm once motion is detected, and this facilitates the prevention of any sort of security breach at that instant.
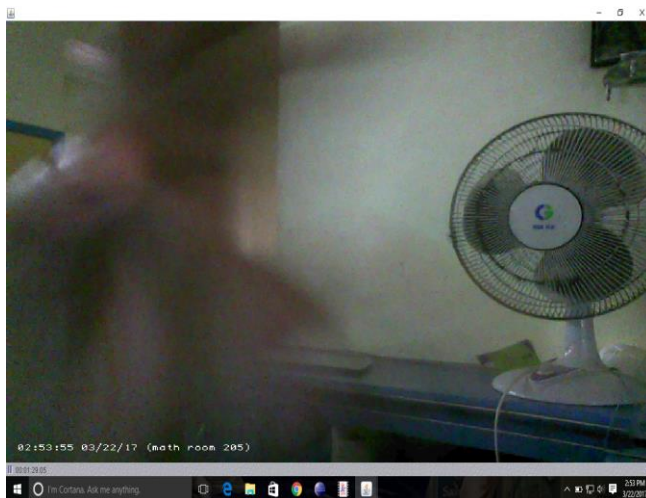
Figure 4. Frame without motion

Figure 5. Captured image on motion detection

V. CONCLUSION AND FUTURE SCOPE

"Intelligent Video Surveillance System for Banks" using webcams introduces an effective video surveillance approach over the current system, based on motion detection. This overcomes the traditional surveying where the presence of human is needed and has to watch keenly for keeping track of the entire system. But now with this project we have introduced a unique technique which is a major advantage to the old system.

In the future, work can be done to view the video clip of everything that occurred in the environment when the motion was detected. Also, further modifications can be employed for sending an alert to the local Police Department after evaluating which Police Station is the closest to the monitored zone in order to take instantaneous action. This system will enable the concerned officials to stop the crime when it is in progress even if they are inaccessible or circumstances do not allow the user to act directly. Though this system has many added advantage, in future we like to upgrade this into the next level that is not only by just viewing the captured images, we can also view the entire video clip and what has been captured.

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