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International Journal Of Engineering And Computer Science ISSN:2319-7242
Volume 3 Issue 3 March, 2014 Page No. 5138-5142

ICDM for Motion of the Object Detection with GCM Alert over Android Phone

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ABSTRACT:

This project has an enhanced feature of smart video transfer and capture character. Smart video surveillance systems are able of enhancing situational awareness across multiple scales of space and time. Video surveillance systems are becoming increasingly important for crime investigation and the number of cameras installed in public space is increasing. However, many cameras inaugurated at fixed positions are required to observe a wide and complicated area. In order to efficiently observe such a wide area at lower cost, mobile robots are an acceptable option. According to the result of moving object detection research on video sequences, the motion of the people is tracked using video surveillance. The moving object is described using the Cauchy distribution model. The Cauchy distribution model will contrast the current frame with the previous frame. The threshold value is determined to find the moving image. Using threshold value the discovered pixel is identified. Hence the motion of the object is identified accurately. After motion discovery, it will send GCM alert to the android mobile application.

Keywords: *Android, Real Time Monitoring, GCM Alerts, RGB, ICDM, Open CV.*

1. INTRODUCTION:

Video Surveillance systems have increase their needs of dynamism in order to allow the different users (operators and administrators) to monitor the system selecting different QoS depending on the system status and to access live and recorded video from different centres, for example, from their mobile devices. More contemporaneously, in IP surveillance systems some resources involved are limited or expensive so dynamic reconfiguration could become competitive advantage for system integrator and designers able to offer flexible applications adaptable to users' needs. Advances in programming paradigms have allowed increasing the dynamism and flexibility of distributed environments. Especially, Service-Oriented approaches provide means of developing decoupled applications in heterogeneous networks by defining the concept of service. A service, in the SOA context, is an entity that receives and sends messages through well-defined intermixes, allowing building more complex applications that increase the value of the system. This concept can be exercised to QoS-aware (Quality of Service) systems, in order to ease the composition and decomposition of applications. Besides, Android is a software stack for mobile devices that includes an operating system, middle-ware and applications that can be suitable for the development of the end-user surveillance application.

1.1. DOMAIN INTRODUCTION:

Surveillance is the monitoring of the behaviour, activities, or other developing information, generally of people for the purpose of influencing, managing, directing, or preserving. Surveillance is therefore a puzzling practice, sometimes creating positive results, at other times negative. It is consistently done in a surreptitious manner. It most generally refers to observation of individuals or groups by government organizations, but illness surveillance, for example, is monitoring the advancement of an illness in a community.

The word surveillance is the French word for "watching over"; "sur" means "from above" and "veiller" means "to watch". The inverse (reciprocal) of surveillance is sousveillance ("two watch from under"). The word surveillance may be used to observation from a distance by means of electronic equipment (such as CCTV cameras), or interference of electronically transmitted information (such as Internet traffic or phone calls). It may also mention to simple, relatively no- or low-technology methods such as human intelligence agents and postal interception.

1.1.1. Benefits of Video Surveillance:

Availability- There was a time when the surveillance techniques were utilized only in shopping malls. Now-a-days, you can notice closed-circuit televisions nearly at any place you visit, from a small stock to homes and holy places. As a result, they guarantee of an extent public security at a fraction of the cost.

Real-time monitoring- Traditionally big organizations have always had the benefits of video surveillance manned by security executives. In the past times, the events captured on video were used to expose important information and work as proof after the event happened. But, current technologies let users to check and reply to alarms immediately.

Using a number of video cameras, a large amount of seeing data is captured that is to be monitored and screened for intrusion detection. Currently, the surveillance systems used requires constant human vigilance. However, the humans have limited abilities to perform in real-time which reduce the actual usability of such surveillance systems. Also such surveillance systems are not reliable for real time threat detection. From the perspective of legal investigation, a large amount of video data obtained from surveillance video tapes need to be analysed and this task is very tedious and error prone for a human investigator. To overcome this drawback, automatic video analysis system is developed that continuously monitors a given situation and reacts in real-time. The proposed system has a capability to sense intrusion and respond to it in real time.

2. ARCHITECTURE

General architecture of surveillance system the video surveillance system uses 3-tier architecture that comprises of client side, application server and a database server. The application server consists of the video server i.e. a central PC which is outfitted with a GSM modem / mobile phone. A standard image is stocked at the server. A web-camera is related to the video server which constantly catching the images. System can start and stop camera using OpenCV functions also video recording takes place using OpenCV. These captured images are constantly compared with the standard image and it is checked for the intrusion. System hold 2 modes which DAY MODE and NIGHT MODE in which in day mode only video reporting takes place and in night mode image capturing and comparing with template image takes place after detecting intrusion video recording takes place. If the intrusion is discovered, the server sends notification to the authorized users via GSM modem/ mobile phone. A database is maintained that holds the mobile numbers of the authorized users that needs to be contacted in case of intrusion. The database can be made to stock these mobile numbers on the basis of priority. The system also keeps the track of all the activities. Hence particularized record of messages sent and received is maintained. As soon as the intrusion is detected, the user is informed about it and the system starts recording the video. The user can login to the application and can view the current videos. The entire surveillance system is made remote using this architecture. The users can mastery the system from a remote place. System accepts commands from administrators which are then used to take necessary actions. E.g. a command like "Change mode" can be used to change the mode of camera from DAY to SMART mode or vice versa. The system only responds to owners mobile numbers. GCM alert received from any other mobiles will be rebuffed. Moreover the communication via SMS is password protected. Hence any other user too cannot control the system from one of the owner's mobile number.

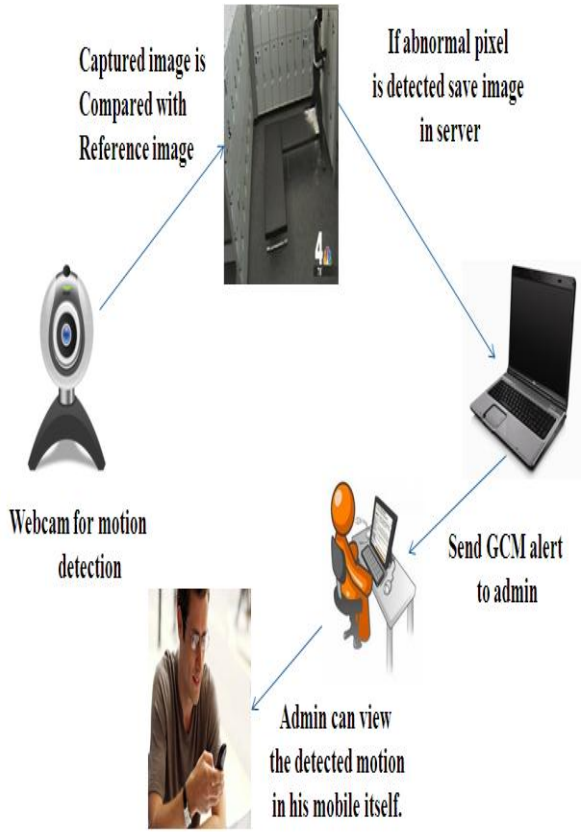

Fig 1: General architecture of surveillance system the video surveillance system

3. FLOW OF THE SYSTEM BEING PROPOSED

Video surveillance provides a cost-effective alternative for public safety workers to monitor activities in almost any location, without accumulate more feet on the avenue. Both fixed and mobile video services can be deployed to deliver a range of benefits to communities while increasing the efficiency and effectiveness of public safety workers.

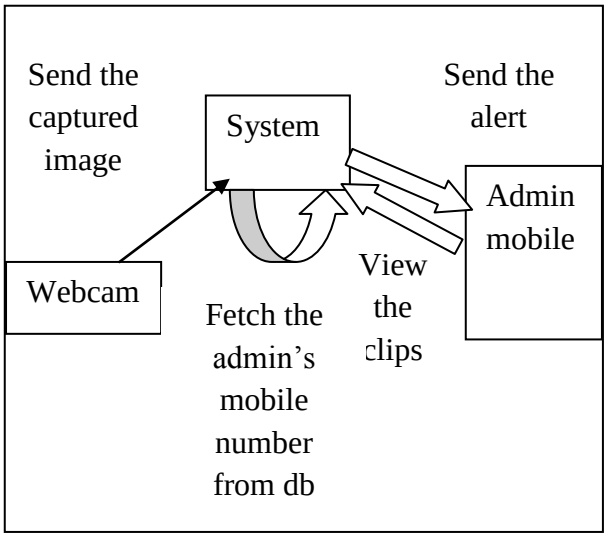

Fig 2: Flow of the system being proposed

The administrator starts the video surveillance system. As soon as the surveillance system is boot up, the system checks if the web camera is connected or not. If the web camera is not related to the system then it will display an error message. Otherwise, the system constantly starts capturing images. A standard image is already stocked in a separate file. The captured images are constantly compared with this standard image and are checked for any intrusion. In case of intrusion, a SMS will be sent to the administrator/owner for appropriate action to be taken. User can then login to the surveillance web application to view the most recent videos. The system waits for a particularized amount of time for response commands (SMS) from any of the owners, after which it takes essential action itself. E.g. the device starts alarming. It can store mobile numbers for all the administrators/owners who need to be contacted in case of emergency. The system holds track/log of all the activities. Hence detailed report of messages sent and received is maintained. Administrator can send commands to control switch on/off of the device. User can also send a series of command sequences scheduled for a later time the commands will be executed automatically at the server when the time arrives System receives commands from administrators which are then used to take necessary actions. The commands may include Activating/deactivating a rely, setting, etc. The system only acknowledges to owners mobile numbers. SMS received from any other mobiles will be rebuffed. Moreover the communication via SMS is password protected. Hence any other user cannot control the system from one of the owner's mobile number. The whole Smart surveillance is made remote using this architecture.

4. SYSTEM IMPLEMENTATION

Fig 3:System implementation of motion of the object detection

- User Registration for Application
- Detecting Motion using Cauchy Distribution Model
- Sending GCM Alert
- Viewing the Detected Image

4.1.USER AUTHENTICATION FOR APPLICATION

User authentication is a means of identifying the user and verifying that the user is allowed to access some restricted service .The main aim of this modules is to authenticate the user to application to view the motion detected image This modules include username and password for authentication to application The validation is based on web service in server.

Fig 4: User Registration for Application

4.2.DETECTING IMAGE USING CAUCHY DISTRIBUTION MODEL

The Main aim of this module is to detect the motion in the particular area. The motion detection is done using Cauchy distribution model and Absolute Differential Estimation .Absolute Differential Estimation is used to compare the background frame and incoming video frame if any changes occur in incoming video frame .Cauchy distribution Model is used to detect the pixel of moving object in the detected incoming video frame.

In the surveillance video, the frames that include a pure background scene are very few. For sample selection in the background-updating stage, we propose a new planning. This strategy fuses the video frames into one pure background sceneto avoid any motion object being added into the backgroundmodel. The method selects pixels that have the largest background probability at each location to construct a new frame described as follows:

If updateNum <= ρb

updateim = (prob_t <= prob_t − 1) ∗ updateim +

(prob_t > prob_t − 1) ∗ currentim;

else

// reinitialize

updateim = currentim;

updateNum = 1.

4.3.SENDING GCM ALERT

Whenever motion detected that image is saved on the server and the server will notify the Google server. The Google server will send a GCM Alert to the android application user mobile who are all registered for that application. Google Cloud Messaging for Android (GCM) is a service that allows you to send data from your server to your users' Android-powered device. This could be a inconsequential message telling your app there is new data to be fetched from the server (for instance, a movie transferred by a friend), or it could be a message enclose up to 4kb of payload data (so apps like instant messaging can consume the Message directly.)

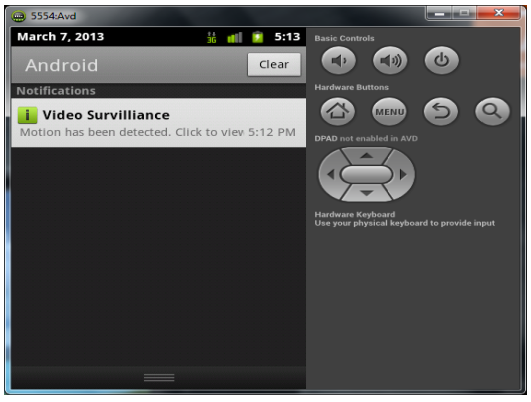

Fig 5:Sending GCM alter to the user

4.4.VIEWING THE DETECTED IMAGE

Android application will receive the notification (GCM) based on project id which is registered in Google account. Application id will unique for each application After receiving the GCM alert from the server to the application and the user needs to authenticate for the application The image can be viewed using the URL which is received from the gcm alert.

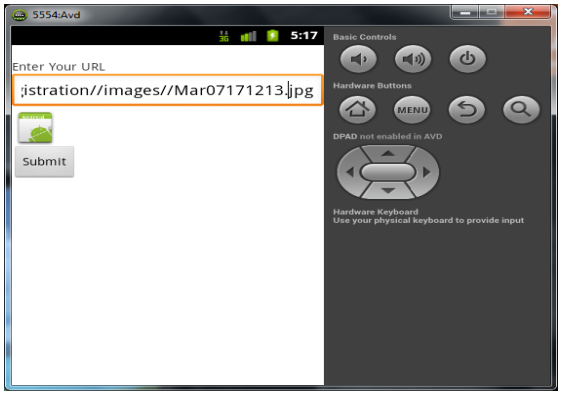

Fig 6: The image can be viewed using the URL

5. BENEFITS OF PROPOSED SYSTEM

- High accuracy in image capturing.
- Send an alert to user's mobile at whatever time a new object is detected.
- Image can be stocked in the server and can be view at the time of motion detection.
- User can view the image, or video clips via his Android mobile itself.
- Programming paradigms have admitted increasing the dynamism and flexibility of distributed environments.

6. CONCLUSION

This project introduced an approach for an effective video surveillance in the current system; this overcomes the traditional Surveying where Human intervention 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. Here usage of Android Smartphone's is essential, in order to effectively capture the image. This project also has a unique feature in which it sends an GCM alert at once there is any sort of variation in the captured pixel. Also we are in intent to dedicate this project to many important Surveillance Areas so that Many Unwanted things can be prevented.

7. FUTURE ENHANCEMENT

Though this project has many added advantage, in future we like to upgrade this into the next level that is not only by just viewing the captured image, we can also view the entire clip of what happened and what has been captured. All this will be done just at the spontaneous moment, within seconds of the action been happened at the site.

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