Modelling of Moving Object Detection using GCM Alert System

Rajath A N, Vishwesh J, Pruthvi P R*

Dept.of CSE, GSSSIETW, Mysuru

DOI: https://doi.org/10.21467/proceedings.1.33
* Corresponding author email: pruthvipr@gsss.edu.in

Abstract

Video surveillance systems are becoming increasingly important for crime investigation and the number of cameras installed in public space is increasing. However, many cameras installed at fixed positions are required to observe a wide and complex area. In order to efficiently observe such a wide area at lower cost, mobile robots are an attractive option. In addition to this thesis, we present an operational computer vision for real-time observing, detection and tracking of human motion in a tough area. Cauchy distribution Model is used to detect the pixel of moving object in the detected incoming video frame. Whenever motion detected that image is saved on the server and the server will notify the Google server. The Google server will send a alert to the android application user mobile who are all registered for that application.

Keywords--Video surveillance, Cauchy distribution model, GCM (Google Cloud Messaging), Android smart phone.

1 INTRODUCTION

Surveillance is the monitoring of the behavior, activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting. Surveillance is therefore an ambiguous practice, sometimes creating positive effects, at other times negative. According to the result of moving object detection research on video sequences, the movement of the people is tracked using video surveillance. The moving object is identified using the Background subtraction. The Background subtraction will compare the current frame with the previous frame. The threshold value is calculated to find the moving image. Using threshold value, the detected pixel is identified. Hence the movement of the object is identified accurately. After motion detection it will send GCM alert to the android mobile application. The existing background subtraction methods can detect moving objects by estimating the absolute difference between each incoming video frame and the background model. There is no accuracy in the captured image. The moving object cannot be detected

 ISBN: 978-81-936820-0-5

correctly. SMS alert about the motion detection to the user. Image cannot be retrieve at the time of motion detection. In the Proposed system, the moving object is identified using the image Cauchy distribution model method. The pervious frame is compared with the current frame. From that the moving object is identified. Here we can detect the exact image of the moving object. Another advantage of this system is when the threshold value is reaching the limit that timeserver detected as a motion. Then the system will alert the user automatically by sending a GCM alert to user's mobile application. User will be using Android Mobile for the Retrieval of Images from the remote place to know whether those images are important and can be ignored. High accuracy in image capturing. Image can be stored in the server and can be view at the time of motion detection.

2 RELATED WORK

A camera is positioned to monitor the area to detect a movement within that particular area. A moving object is detected within the monitored area is the first phase. The detection of a movement uses a simple but efficient method of comparing pixel image values in subsequent frames captured from the surveillance camera. Two images frames are needed to detect any movement. The first frame is called reference frame, represents the reference frame values for comparison purpose, and the second frame, which is called the input frame, contains the moving object. The two frames are compared and the differences in pixel values are determined. Pixel values are threshold and saved in a third frame, which is called output frame, with a black or white background. If the "difference" average pixel value is smaller than a certain threshold value, then the output frame image will be white otherwise, the background will be black. After tracking the moving object motion, the previous input frame will now be used as a reference frame, and a third frame is captured and is called now the input frame. This process is repeated with the frames being captured every second, where the same method is applied. If there is a difference between the reference and input images frames, then an output image is created. The obtained output image contains an object that will be extracted [3].

3 SYSTEM MODEL

The surveillance-based service provides a secure the particular place from the unauthorized person and alert the user by sending message if unauthorized person enters a service, in the SOA context is an entity that receives and sends messages through well-defined interfaces, allowing building more complex applications that increase the value of system. This concept can be applied to QoS-aware (quality of service) systems, in order to ease the configuration and reconfiguration of applications. Besides, android is a software stack for mobile devices that includes an operating systems, middleware and applications that can be suitable for the development of the end-user surveillance application. The camera is placed around 5meters in the surveillance region to effectively identify the motion detection. The following model explains the system implementation.

ISBN: 978-81-936820-0-5

Series: AIJR Proceedings
Proceedings DOI: 10.21467/proceedings.1

A. User Authentication for Application

User authentication is a means of identifying the user and verifying that the user is allowed to access service. This module allows to view the motion detected image which include username and password for authentication to the application.

B. Viewing the Detected Image

Android application will receive the notification from GCM based on project id which is registered in Google account. After receiving the GCM alert from the server to the application, the user needs to authenticate, and the images can be viewed using the URL which is received from the GCM alert

C. Detecting Image Using Cauchy Distribution Model

The Main aim of this module is to detect the motion in the area. The Cauchy distribution, named after Augustin Cauchy, is a continuous probability distribution. It is also known, especially among physicists, Cauchy Lorentz distribution, Lorentz (ian)function, or Breit–Wigner distribution. The simplest Cauchy distribution is called the standard Cauchy distribution. 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. Erosion filter is used which identifies the motion more efficiently.

D. 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 senddata from your server to your users' Android-powered device. This could be a lightweight message telling your app there is new data to be fetched from the server (for instance, a movie uploaded by a friend), or it could be a message containing up to 4kb of payload data (so apps like instant messaging can consume the message directly).

E. Architecture:

As soon as the surveillance system is initialized, the system checks if the web camera is connected or not. If the web camera is not connected to the system then it will display an error message. Otherwise, the system continuously starts capturing images. The captured images are continuously compared with the reference image and are checked for any intrusion. In case of intrusion, a notification will be sent to the user for appropriate action to be taken.

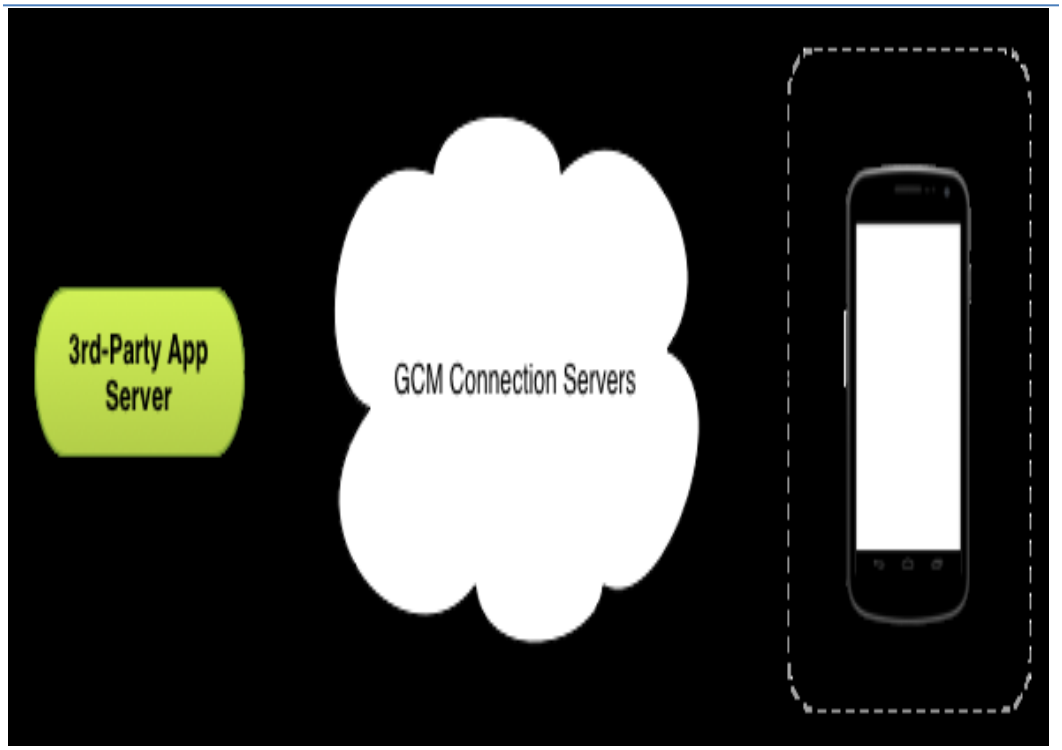
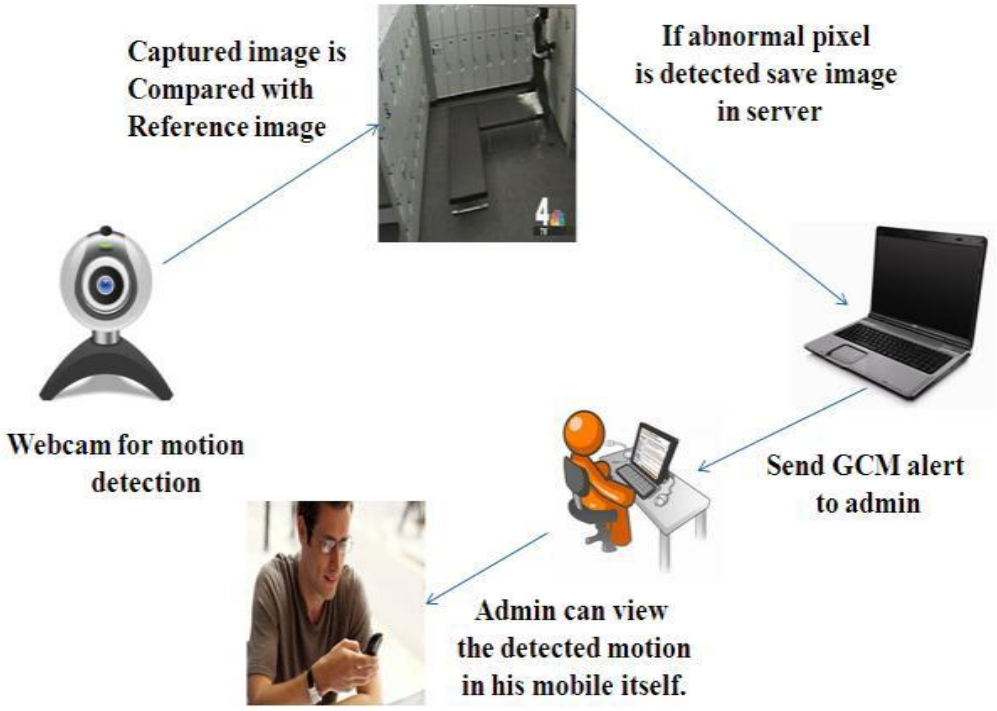


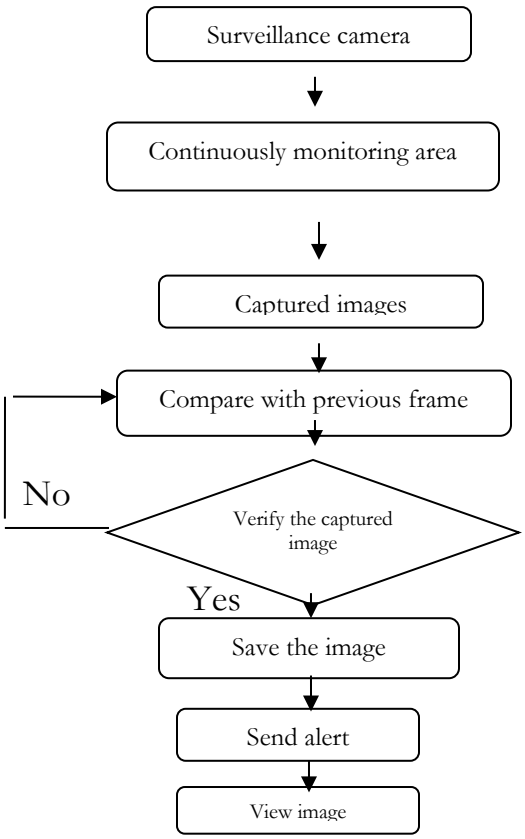
Figure: GCM Architecture



ISBN: 978-81-936820-0-5
Proceedings DOI: 10.21467/proceedings.1

4 FLOW CHART

The flowchart of the complete project is shown below:



5 EXPERIMENTAL RESULTS

All experiments were done on Pentium Dual Core 2.10 GHz with 2GB RAM under Visual Studio 2010. In the experiments, we have captured 50 images which are detected based on the threshold value. The satisfactory result has been obtained: the success of capturing the motion detected is up to 95%. This method identifies the motion by capturing the images with minimal fault identification.

6 CONCLUSION

This project introduced an approach for an effective video surveillance in the current system which overcomes the traditional Surveying where Webcam Send the captured image and Send

the alert to user mobile which is very effective. The use of Cauchy Distribution Model minimizes both false and missed detection.

7 FUTURE ENHANCEMENT

In future we like to upgrade this into the next level thatis not only by just viewing the captured image, wecan also view the entire clip of what happened andwhat has been captured. All this will be done just atthe spontaneous moment, within seconds of theaction been happened at the site.

REFERENCES

[1] I. Estévez-Ayres, P. Basanta-Val, M. García-Valls, J. A. Fisteus and L. Almeida, ―QoS-aware Real-TimeComposition Algorithms for Service- BasedApplications‖, IEEE Trans. on Industrial Informatics,vol 5 (3), pp. 278-288, Aug. 2009.

[2] AndroidOperating System [3] H. Schulzrinne, A. Rao and R. Lanphier,"Real Time Streaming Protocol (RTSP)", RFC2326,

[3] J. Y. Hao, H. Shen, C. Li, Z. Xiong, and E. Hussain, "Vehicle behaviour understanding based on movement string," in Proc. 12th Int. IEEE Conf.Intell. Transp. Syst., 2009, pp. 243–248.

[4] T. B. Moeslund, A. Hilton, and V. Krüger, "A survey of advances in vision-based human motion capture and analysis," Vis. Image Understanding, vol. 104, no. 2/3, pp. 90–126, Nov./Dec. 2006.

[5] I. Haritaoglu, D. Harwood, and L. S. Davis, "W4: Real-time surveillance of people and their activities," IEEE Trans. Pattern Anal. Mach. Intell., vol. 22, no. 8, pp. 809–830, Aug. 2000.

[6] J. Yao and J. M. Odobez, "Multi-layer background subtraction based on color and texture," in Proc. IEEE CVPR, 2007, pp.1–8.

[7] I. Estévez-Ayres, L. Almeida, M.García-Valls and P.Basanta-Val, ―An Architecture to Support Dynamic ServiceComposition in Distributed Real-Time Systems‖, Proc ofthe 10th IEEE International Symposium onObject/component/service-oriented Real-time distributedComputing (ISORC), May 2007. Santorini Island, Greece.

ISBN: 978-81-936820-0-5
Proceedings DOI: 10.21467/proceedings.1

Series: AIJR Proceedings