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Video Motion Surveillance System

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Abstract
Detection of motion is the important step in video surveillance and detect the regions belongs to moving objects. Classification of objects and activity recognition is done by using the motion information. Sequences obtained by the dynamic camera are not suitable by object detection methods using background modeling. In unstable environment, an accurate and proper object detection method is needed. The proposed work represents an object detection algorithm. Surveillance systems used in different applications in different environment. Due to the incompleteness of this area, we proposed the Cauchy distribution model for detecting the human movement.

Keywords: *Video Surveillance, Back ground modeling, Background subtraction*

I. INTRODUCTION

Object movement detection is an important issue in computer vision and image processing filed. Moving object detection is considered as important method for different object recognition and application of analysis [8,9]. Background modeling is not effectively used in video sequences captured by the camera. Background modeling based object detection is not suitable for video sequence captured by dynamic camera. Motion detection using fixed camera causes major challenges in extracting the shape of moving object. Several issues are related to weather conditions, Illumination variation, similarity in back ground color and distance from the camera.

In the movement detection, upcoming frame is assigned with the current frame. This procedure repeated for all the upcoming frames. Error is calculated by the difference between the current and registered upcoming frames..

II. RELATED WORK

Sihau et al [1] proposed the retrieval system which is based on human retrieval system for surveillance video data using big data processing tools. Motion information can be used for video data segmentation. Segmentation is applied to remove redundant video contents and data volumes. They used map reduce framework for processing clips for finding human movement detection. It is mainly based on pre processing, content analysis of video , structuaralization and query procesing. segmentation of video data is done by using magnitude of the motion vectors. Short video clip and image are used as query input.

Seungwon Lee et al [2] proposed a method for video surveillance systems for movement information. Quantization is performed for motion vectors and segmentation is applied for moving objects. Adaptive block partitioning is applied in object region. Adaptive binary pattern using local binary pattern is applied for solving the issue of frame difference. Classification is applied for segmented regions using directional labelling

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method. They eliminate the use of excessive buffer memory.

Seungwon et al [3] proposed object detection mechanism with unstable camera. Least square method is used for detection camera motion. Estimated global motion is used for registering the subsequent frames. Accuracy of the motion estimation is improved by using refinement step. Performance can be tested by using handheld camera. Background modelling can be used for estimating the kernel density. Memory space and computational cost is reduced by using background modelling.

Tan Zhang et al [4] proposed a wireless distributed system for tracking and surveillance system in the environment. The controller is responsible for all the parts of the system and provide the answer for query. Intra cluster algorithm is used for determine the important frames from cameras. Object re identification determine the redundant objects in the cluster.The re identification algorithm identify the detected face belongs to the same person or not.

Amira et al [5] proposed the framework for finding abnormal behaviours the training phase. The moving objects are extracted and grouped by using fuzzy clustering method. Set of auto encoders are used in the testing phase for detecting anomalies. Multiple cameras are used for capturing the different views for the moving object.

Ahmad jalal et al [6] proposed a framework for dividing the actions into meaningful ordered temporal segments and identify the human shape by using pixel neighboring intensity difference method. They converted the depth map data into binary edge for developing human shape edges. Fisher discriminant analysis is used for reduce the dimension of data. Effective data sharing access in discussed in crime reporting [7].

III. PROPOSED WORK

The main aim of the proposed work is to reduce the unnecessary video contents. Segmentation is applied in the into pieces. In human movement detection in video surveillance , movement information shows that the information of moving objects in view. Initially, feature extraction is performed for the detection of motion vectors and perform the denoising operation for detection of motion .

A. Background subtraction

Background subtraction is performed by observing the video sequence and observe the front moving objects. Moving object is made up of color differentiation from the movement observed in background. Temporal median filter is used for estimation of image. Illumination changes and background changes are described as given below:

$$B_{p,t+1} = (1-\alpha)B_{p,t} + \alpha.C_{p,t}$$

Where $B_{p,t}$ *and* $B_{p,t+1}$ represents the back ground model at pixel p in time t and t+1.

Video data are compressed by using magnitude value of the motion vectors. Volume of the video are reduced and transmitted in the compressed format. Video compression is necessary for storage and transmission. Video compression is based on redundancy reduction. The reduction of redundancy is performed by using intra frame prediction and inter frame prediction and subtraction of predicted frame from the current frame. Video clips are made up of sequences of individual images.

The MPEG encoder make the prediction and encode the difference between the prediction and the image. The encoder must reorder the images before the predicted ones. The decoder reorder the images back to original sequence.

Boundaries in video are detected by using change point. Sliding window is applied with the time axis. Threshold is used for deciding the change point. Motion values are compared with the threshold value. When the value exceed the range and decrease the range also recorded. Clips are calculated by change point detection. Video frame between each pair of the starting frame and ending frame formed as one Clip. Erosion and dilation operations are appled for removing isolated non zero points. Blobs whose size are smaller than the threshold are removed in the frame.

Change point are detected by using sliding window is applied along with the time. If a segmented block

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is larger than basic block, the most frequent motion is assigned as the representation motion of clips. If a clip has more than one equator of zero basic motions , it is considered as motionless block. Finally , the segmented regions are classified into the corresponding object regions. After tracking the movement of object motion, the previous input frame segment now used as a reference frame.

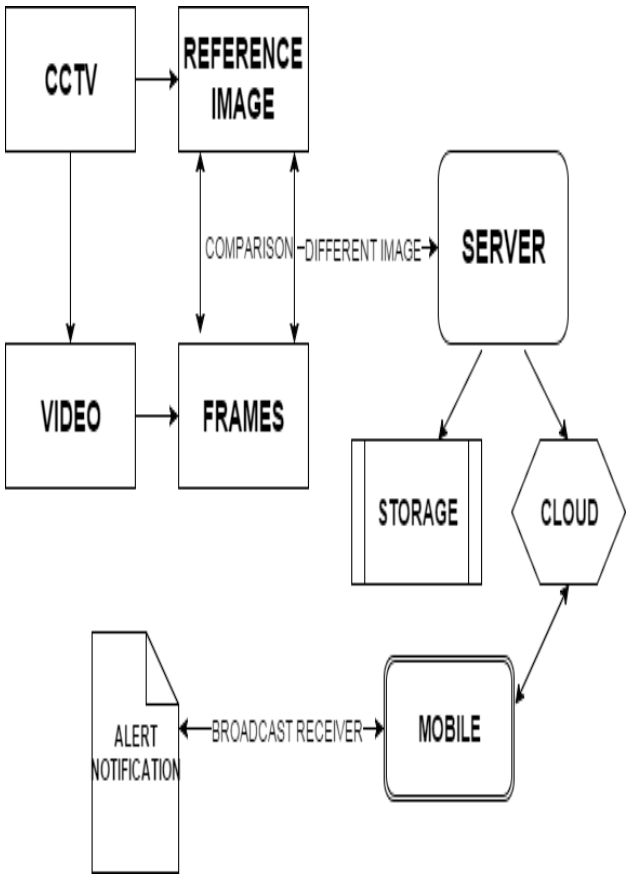


Fig 1 Proposed Architecture

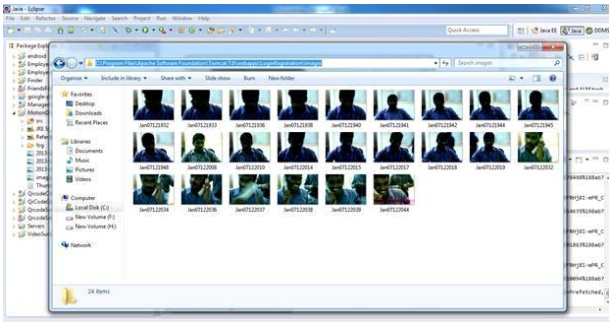


Fig 3: Detected Images

Android app will get the notification based on the id registered in google account. After receiving the alert from the server to the application and the user need to perform authentication.

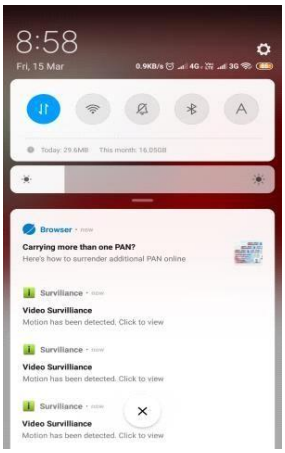
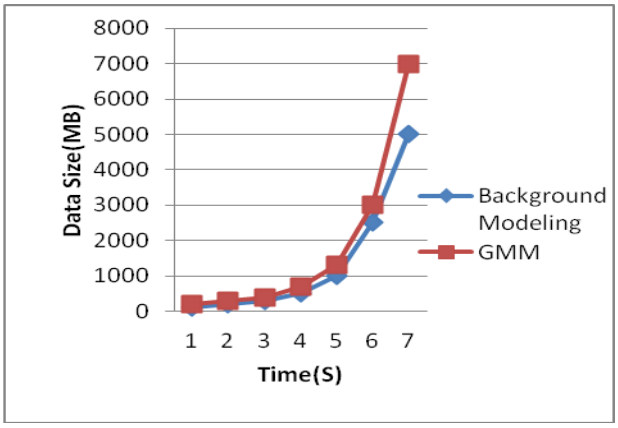


Fig 4: GCM alert message

IV. PERFORMANCE ANALYSIS

Video data used for proposed work is based on different cameras monitoring traffic in day time. All videos in this work have resolution of 1920*1080 with 50 frames per second. We performed precision and recall of the proposed work. Frame rate with inconsistent produce the major error in video processing. False alarm is detected when no movement is contained in the video segment. Pre processing is performed in raw videos and it is segmented in to different M segments. Our proposed work is compared with Gaussian mixture model. Compared with existing work, there is a significant gap in processing time.



The overall retrieval time cost is analyzed in this work. In the query evaluation, same query is tested for different data size. The time cost is based on feature extraction procedure performed in a video feature extraction of the video query and searching operation. Majority of the time spent for feature

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extraction than searching. Retrieval time is calculated by using time to process the query videos.

Human retrieval accuracy is evaluated by video input that describing appearance and input text describing the action. When the query arrived, the system returned the result based on the similarity of the appearance. The testing dat set size is 30 GB. The performance of the single running query has precision of 85.5% and recall of 100% recall for our query. The following table I shows the query results.

QUERY	GAUSSIAN MODEL	PROPOSED BACK GROUND MODELING
RUNNING+WHITE	15	23
RUNNING+RED	12	15
RUNNING+GREEN	10	14
RUNNING+YELLOW	13	17
RUNNING+BLUE	9	13
RUNNING+GREY	8	12

V. CONCLUSION

In this work, we designed a back ground modelling technique for surveillance of video data. Video segments are processed and used as basic elements for movement detection. Acceleration is achieved by using motion vectors. This project introduced an approach for an effective video surveillance in the current system. Our system evaluation based on one order magnitude in time with improved accuracy for movement detection.

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