

Storage Optimization of Video Surveillance

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Abstract— Video surveillance becomes easier to monitor the premises and also gather information of an incident. Video surveillance is an important component for the protection of infrastructures. As digital and networking technologies have been expanding worldwide and penetrating into many traditional industrial areas during the past years, the video surveillance industry has rapidly adopted these technologies. Now a day Closed-circuit television (CCTV) or video surveillance is the most useful technology used in the field of security purposes. CCTVs can be found at many places. The proposed idea is to reduce the storage space. We are proposing a method to optimize the storage space occupied by the CCTV footage. The approach will optimize the storage space occupied by unnecessary data, as well as it maintains quality of the video.

Keywords: Storage, Optimization, CCTV, Compression, Frames



Fig. 1: CCTVs

I. INTRODUCTION

Video surveillance is the most useful technology used in the field of security. CCTV cameras are basic requirement for security of any places like colleges, home, hospitals, banks, ATMs etc., but it requires high maintenance cost of upgrading memory after a certain period of time.

One of the most challenging problems in installing the cameras at large scale is storage space occupied by the footage. Because each day, camera stored large amount of data. That data is may be size of 10 GB per day at its lowest quality. But some of these data may be useless when there is no activity is performed, because camera is active 24X7 and records everything. There are millions of cameras present in the world and storage of data is huge problem. So, to reduce the storage space compression techniques are used. And optimized video will be stored on hard disk.

The optimization of video size can be done by removing redundant frames by comparing adjacent frames using MSE. Compression and image processing techniques are also used. This approach will optimize the storage space, maintaining information as well as quality. Whenever the motion sensor detect a movement then the camera will start streaming, take image and recognize by using open Computer Vision (CV) technique (Image processing).

Image processing is a method of converting an image digitally and performing certain operations on it where the input is an BGR (Blue, Green, Red) image and output can be a grey image or functions associated with the image. Result of optimized video of same information stored in less disk space.

System will provide face detection facility in which, whose faces are regularly occurred in the video their count will be detected by reports generation. The notification of movement after official time will send to the administrator for security purpose.

II. PROBLEM IDENTIFICATION

The most challenging problem in camera is large storage space occupied by the footage. Because each day, the camera captured large amount of data and stored it, but some of these data may be useless. Hence image processing techniques and compression techniques will be used to overcome this problem.

III. OBJECTIVES

- To reduce storage space occupied by the unnecessary data.
- To reduce the time required to access any footage.
- To provide E-mail notification for security purpose.
- To provide face detection facility for analytical purpose.

IV. LITERATURE SURVEY

“Storage optimization of video surveillance from CCTV camera” by Shikhar Arora, Karan Bhatia, V Amit. IEEE.

“An Efficient Image Compression Algorithm Based on Histogram Based Block Optimization and Arithmetic Coding” by Subarna Dutta, Aditya Abhinav, Partha Dutta, Purushottam Kumar, and Amiya Halder.

“Storage Optimization of Video Surveillance from CCTV Camera” by D.Suganya, R.Shyla, V.Jayasudha, S. Marirajan.

“A New Algorithm for Data Compression Optimization” by Agus Dwi Suarjaya.

V. PROPOSED SYSTEM

The main objective is to propose a method to optimize a size on disk of video clip obtained from a camera. In this

optimization process camera is active all the time but it only captures the video if there is any occurrence of movement. It stores the video in the form of frames and system will check the difference among the frames by images processing algorithms.

System contains threshold value. If the difference between two frames is above threshold value then camera will start the recording until it comes to below threshold value. For security purpose system provide E-mail notification facility in which if any unauthorized movement will happen then it capture the snapshot of that movement and send through e-mail to the administrator. Also, the system will provide face detection facility in which the number of faces are detected and their reports are get generated.

VI. SYSTEM ARCHITECTURE

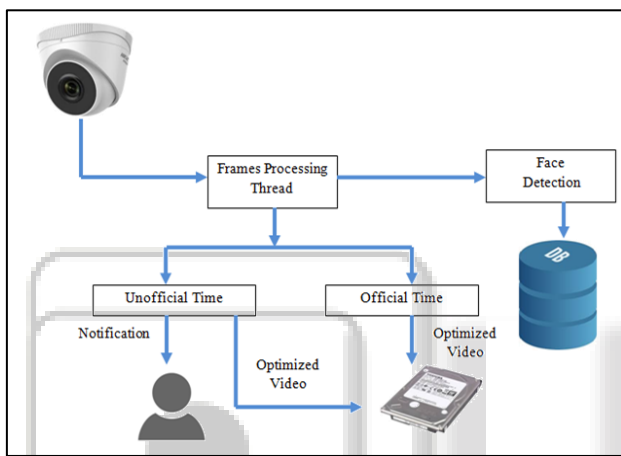


Fig. 2:

VII. FLOW CHART

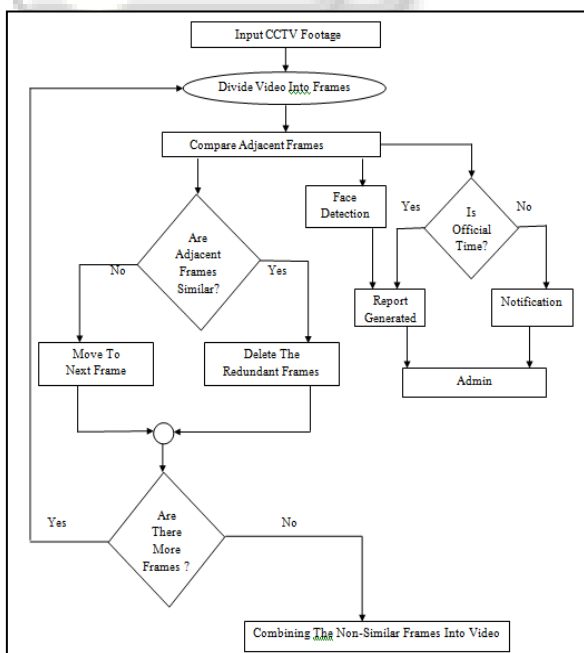


Fig. 3:

VIII. DATA FLOW DIAGRAM

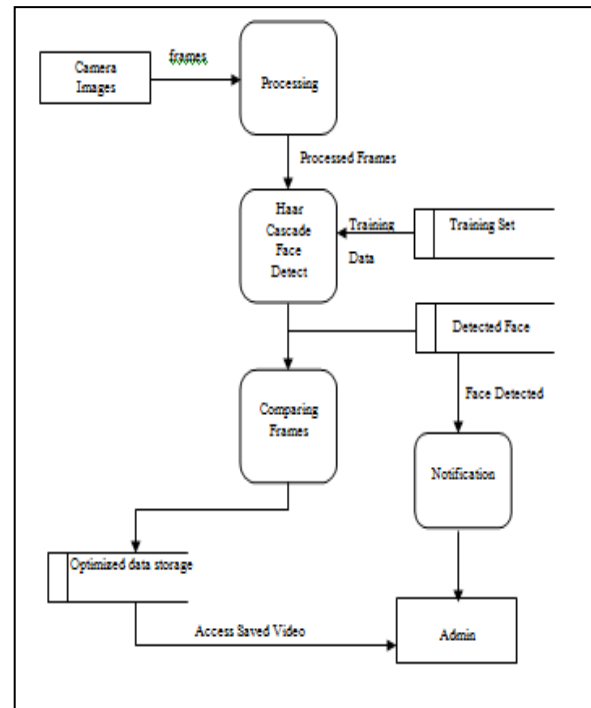


Fig. 4:

IX. MODULE

A. Project consists of four modules:

- Getting frames from camera.
- Comparing adjacent frames of video.
 - 1) Comparing frames with threshold value.
 - 2) Deleting frames having value less than threshold value.
 - 3) Combining remaining frames into the video.
- Face detection method.
- Sending notification to administrator.

X. ALGORITHM

- 1) Step 1: Input CCTV footage.
- 2) Step 2: Extract frames from video.
- 3) Step 3: Calculate the MSE value for previous frame and current frame.
- 4) Step 4: Set previous frame = 1st frame and current frame = 2nd frame.
- 5) Step 5: if $MSE \geq \text{Threshold}$, then
 - previous frame = current frame
 - current frame = previous frame + 1
 - save the previous frame
 - else
 - current frame = current frame + 1
- 6) Step 6: if there are more frames
Repeat Step 5
else
- Combine the resulted frame to get optimized video with same frame per second(fps).
Delete original video and frames of both videos.
- 7) Step 7: if face is detected during the video then reports are get generated.
- 8) Step 8: Set official time

If any movement is happen within unofficial time then notification is send to the admin.

XI. ANALYSIS OF EACH MODULE

A. Module 1: Getting frames from camera

Camera is continuously monitoring and getting input from camera in form of frame.

B. Module 2: Comparing adjacent frames of video.

There is a comparison between previous frame and current frames. System is having with specific threshold value calculated by MSE algorithm.

1) Comparing frames with threshold value.

Current frame is getting compared with threshold value.

2) Deleting frames having value less than threshold value.

Frame, whose value is less than threshold that frames are discarded and they will not stored into the video.

3) Combining remaining frames into the video.

Frames, whose value is equal or greater than threshold value those frames are combines together into the video.

C. Module 3: Face detection.

It will show count of faces detected with report generation.

D. Module 4: Sending notification to administrator.

If any movement will happen after official time it's email notification will be send to the administrator.

XII. EXPECTED OUTCOME

Instead of storing video of unnecessary data system should allow to store an optimized video on hard disk, due to this space required to store any footage can be reduced. Face detection of people should be done and reports of face count should be generated, this face detection facility provides security. After official time if any moment will happen then its email notification should send to the administrator, which will helps in gain the security. Also the time required to access any footage should be reduced.

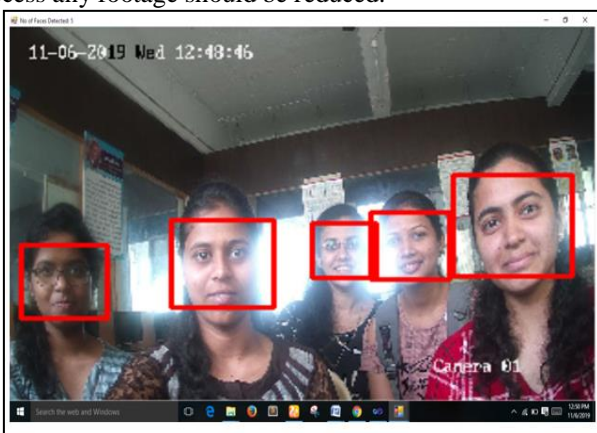


Fig. 5:

XIII. FUTURE SCOPE

Face detection facility can be implemented with face recognition.

This optimized technique can be implemented in hardware like CCTV camera.

XIV. CONCLUSION

The system is design for storage optimization especially for CCTV. As a storage is a real challenge with installation of CCTV. With the same motive system is giving satisfactory result by reducing average storage space required for any footage.

Analyzing the regular faces occurs in the video and reports will be generated. The notification of movement after official time will send to the administrator.

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