VIDEO SEGMENTATION & SUMMARIZATION

Pratyush Pranjal **Rohit Lakhdive**

AtulKumar Varma **Aditya Vasave**

Vishwakarma Institute Of Information Technology, Kondhwa(bk),pune-48,Maharastra,India.

Email:pratyushp.viit@gmail.com,

ABSTRACT

In the present world video surveillance has become an integral part of security systems.The system takes the long stable video of type .mp4 or .avi as a input in which some kinds of movements in the video. So that to extract the only movements from the video, first we have to identify the time where the movement are happened, for that we fetch the frames (images) from the video after some intervals. And match those frames with each other, in that matching if some movements are find out then we will set the trigger at the start of movement, and the trigger ends when movement is stop. Likewise we will find out the all movements from the input video, after that user can play the separate movements, or he can play the one complete video with all movements.

INTRODUCTION

These video surveillance systems are used on very large scale everywhere in today's world. But nowadays the problems faced by security systems are that the data generated is very huge. The meaningful part in that data is very small compared to the data which is extracted. So it is difficult for us to identify the meaningful part and its time consuming process as well. The observation in the surveillance was that the most part of the video did not contain any substantial movements. So we tried to extract only that part of the video which had some meaningful movements. This approach makes us to concentrate only on the important events and ignore the meaningless part. By following this method we generate small segments of videos located at various parts of the whole video. Later on we merge these small segments into a single video which will be the summarized part for the whole video. For evaluating segmentations, we define similarity adjacency functions, which are extremely expensive to optimize with traditional methods.

Existing System

If the user wants to see only the movements from the video, then he has to go through the whole video, after that he can get parts from the video where some movements are happened. The process takes much time.

Proposed System

The proposed system is use to automatically extract the parts from the video where some movements are happened, there is no need to go through the whole video, so that it saves the valuable time of user.

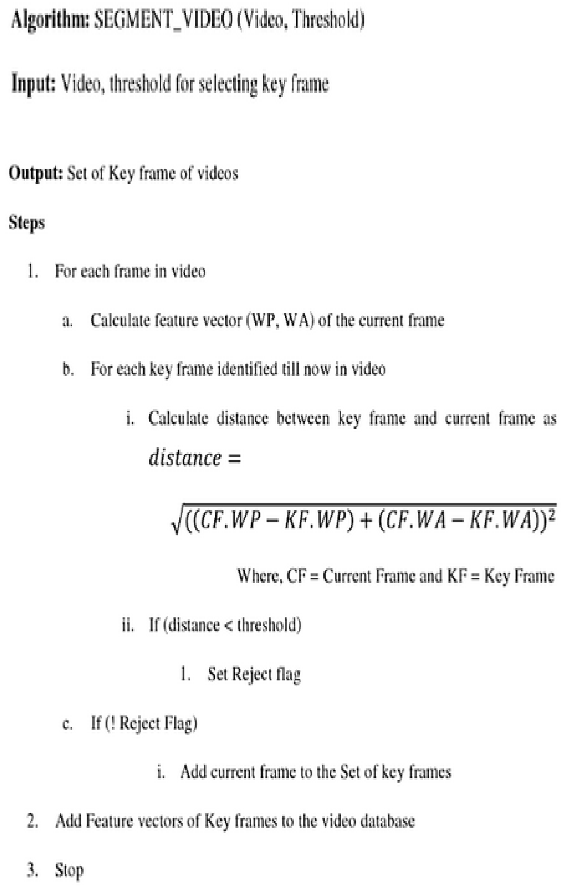
Key Frame Extraction

Since video key frames are pictures that can represent main content of the shot, the key-frame extraction has been the foundation of video analysis and content-based retrieval. At present, most existing key-frame extraction techniques are based on original video streams. Due to the time-consuming procedure of decoding, those methods are obviously inefficient. In this paper, we extract motion information from compressed MPEG streams and apply rough set theory to obtain the decision rules implicated in motion information and key frames. Experimental results show that this approach is able to represent the visual content with less computational time.

Comparison of Video frames

After getting the key frame which were extracted from the video which is to summarized or compressed, we will compare those frames each other continuously. If we encounter any change in the consecutive frames we will generate a trigger at that particular movement. Some images may have distinctive segments/regions of interest. These regions probably contrast highly with the rest of the image, and are a good item to search for in your other images to find matches.

Algorithms



```
Algorithm: SEGMENT_VIDEO (Video, Threshold)

Input: Video, threshold for selecting key frame

Output: Set of Key frame of videos

Steps

1. For each frame in video
    a. Calculate feature vector (WP, WA) of the current frame
    b. For each key frame identified till now in video
        i. Calculate distance between key frame and current frame as
           $distance = \sqrt{((CF.WP - KF.WP) + (CF.WA - KF.WA))^2}$
           Where, CF = Current Frame and KF = Key Frame
        ii. If (distance < threshold)
            1. Set Reject flag
    c. If (! Reject Flag)
        i. Add current frame to the Set of key frames
2. Add Feature vectors of Key frames to the video database
3. Stop
```

Thresholding Techniques

In many applications of image processing, the gray levels of pixels belonging to the object are quite different from the gray levels of the pixels belonging to the background. Thresholding becomes then a simple but effective tool to separate objects from the background. Examples of thresholding applications are document image analysis where the goal is to extract printed characters, logos, graphical content, musical scores, map processing where lines, legends, characters are to be found, scene processing where a target is to detected , quality inspection of materials. Other applications include cell images, and knowledge representation, segmentation of various image modalities for non-destructive testing (NDT) applications, such as ultrasonic images, eddy current images, thermal images, spatial-temporal segmentation of video images etc.

Segmentation

The segmentation gets started with the start of motion trigger generation. With the comparison of the frames, trigger keeps on generating till the end of last frame. Once all triggers are generated, segmentation stops with the end of triggering. We maintain a tabular matrix to store the triggered values of each and every segments so that at last we will have all the start and end values of all segments.

Summarization

After segmentation process ends, very next goal we have to achieve is to summarize those segments. For summarization we go through following steps:

1. Very first we will take all the start and end values of different segments.

2. According to the values we will sort out the segments in such a manner that they will have the extra buffer time (pre/post) like 10 seconds before and after for each segments.

3. The reason for the extra buffer time is to represent the summarized video in a very sort way that it should not overlap with each other.

The segments what we have extracted from the video can be viewed either separately in clip format or we can view them as a video by merging all the small clips.

Modules Information

Module 1 :
Module contains some basic GUI, which takes .mp4 or .avi video as a input, and extract the frames after some fixed interval using Xuggler API.

Module 2:
Compare the frames using SEGMENT_VIDEO algorithm and maintain the start and end time of each parts where the movement are happened.

Module 3:
Extract the parts from the video according to the start and end time using JMF API or by manually by considering video file as binary file.

Module 4:
User can play the separate parts of movements, as well as he can combine the parts and make the complete the video and play it.

Importance of this technique

In case of a theft these process will be helpful for a faster investigation. We don’t need to go through the whole video. We can just view the summarized video of it. Also the memory consumed by summarized and segmented video is very less. Finally we will be able to extract the clear context description of the video.

Application

In this project of VIDEO SEGMENTATION AND SUMMARIZATION we are going to take the video surveillance of those places which are highly secured. In such places the movement takes place once in a while or we can say for a very short period of time. In such situations throughout recording will result in wastage of resources. Places which will come under this methodology are:

1. Rooms or cells where banks store their money.
2. Godowns where military weapons and equipments are stored.
3. Server rooms.
4. Night surveillance of museums, govt. offices.

Usefulness/ Advantages

1. Automatically extract the parts from the video where movements are happened.
2. Saves the time of the user to see only movements.
3. Only frames will compare after some interval, so system takes less time to extract.
4. User can see the each part separately or complete extracted video.

Useful Java Tools

JMF :

The Java Media Framework API (JMF) specifies a simple, unified architecture to synchronize and control audio, video and other time-based data within Java applications and applets. The JMF 1.0 API specifies playback behavior and was developed by Sun Microsystems, Inc., Silicon Graphics Inc., and Intel Corporation. The JMF 2.0 API specifies playback, capture, transmission and transcode behavior, and was developed Sun Microsystems, Inc., and IBM; both companies worked jointly on the JMF 2.0 reference implementation.

XUGGLER:

Xuggler allows Java programs to decode, encode, and experience (almost) any video format.

Conclusion

Video summarization is an important tool for document preparation and archival applications in large video databases. In this paper we have presented an overview of how to summarize a video through merging segments of different events. There are several methods which we have tried to concatenate with each other to form a sorted video out of a huge big film or video. We implement the proposed algorithm and obtain encouraging experimental results. We conclude by this paper that it’s wastage of resources by recording videos for long time instead we can get the summarized video. Those summarized videos will be more meaningful and can fulfill the purpose of video surveillance. In the future, we will further employ high level semantic information of the video to make better video summaries. Moreover, intra-shot compression will be studied to shorten the video shots' length so that the content coverage of the video skimming can be further magnified.

References

1. Shi Lu, Irwin King, Michael R.Lyu Department of Computer Science and Engineering. The Chinese University of Hong Kong Shatin, N.T., Hong Kong SAR fslu, king, lyug@cse.cuhk.edu.hk. “A Novel Video Summarization Framework for Document Preparation and Archival Applications”

2. Murali S PET Research Center P.E.S. College of Engineering Mandya, Karnataka, India. Girisha RPET Research Center P.E.S. College of Engineering Mandya, Karnataka, India. "Adaptive Object Segmentation from Surveillance Video Sequences"

3. Patrick Chiu, Andreas Girgensohn, Wolf Polak, Eleanor Rieffel, Lynn Wilcox FX Palo Alto Laboratory, 3400 Hillview Ave, Bldg 4, Palo Alto, CA 94304, USA, lastname@pal.xerox.com "A GENETIC ALGORITHM FOR VIDEO SEGMENTATION AND SUMMARIZATION "

4. Vijay Katkar MPSTME and NMIMS University Mumbai, Amit Barve Fr. Conceicao Rodrigues College of Engineering, Mumbai. "Efficient Content Based Video Retrieval for Animal Videos"

5. Tao Xiang∗ and Shaogang Gong Department of Computer Science Queen Mary, University of London, London E1 4NS, UK {txiang,sgg}@dcs.qmul.ac.uk. "Activity Based Surveillance Video Content Modelling"