



A Survey on Content Based Video Retrieval System

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ABSTRACT: Content based video retrieval is one of the most important and recent research area in the Image processing domain. With the development of multimedia data types and available bandwidth there is huge demand of video retrieval systems, as users shift from text based retrieval systems to content based retrieval systems. Content based video retrieval can be used for multiuser systems for video search and browsing which are useful in web applications. Content based video retrieval may be defined as an approach in which the videos are retrieved from the large database based upon their visual contents.

Keywords: Content based Video Retrieval, CBVR, Video retrieval system, video Segmentation, video retrieving process

I. INTRODUCTION

Nowadays, the capture, storage, uploads and delivery of videos has become effortless due to the rapid advancements in digital devices, Internet infrastructures, and Web technologies. The search for video content over the Web has been extremely challenging even with the accomplishment of the web search engines. Videos are a powerful and communicative media that can capture and present information. The rapidly expanding digital video information has motivated growth of new technologies for effective browsing, annotating and retrieval of video data. Without a proper video retrieval mechanism; it becomes tiresome for the users to retrieve the video content of their interest. This led to the development of an automatic and effective mechanism for video retrieval. Users are more diverted to content based search rather than text based search.

Content based video retrieval method is presented for retrieving the video from video database. The content based approach for video retrieval focuses on retrieving similar videos based on the video contents. Content based means that the search will analyze the actual content of the video. The term 'Content' in this context might refer colors, shapes, textures. In text based video retrieval system videos get retrieved based on the static keywords or caption information presented in the video.

Motivation:

- There is an amazing growth in the amount of digital video data in recent years.
- Lack of tools for classify and retrieve video content
- There exists a gap between low-level features and high-level semantic content.
- To let machine understand video is important and challenging.
- Automated or semi-automated methods can save people's time and money.

Content Based Video Retrieval (CBVR) System it includes various steps: Video Segmentation: Segments the video into shots, Key frame Selection: Selects the key frame to represent the shot, Feature Extraction: Features are extracted for the key frame and stored into feature vector. Features are of two types that are spatial and temporal. Spatial features are further classified as color, shape and edge; similarly temporal features are also further classified as motion and audio. For retrieving the video from warehouse, the retrieval subsystem processes the presented query, performs similarity matching operations and this can be done using any video retrieving algorithm, and finally displays the retrieved videos to end user.

II. RELATED WORK

Many researchers have made related work regarding the content based video retrieval; efforts have led to the development of methods that provide access to video data. These methods are used in various applications and fields such as Computer Vision and Pattern Recognition.

[1] In this paper Oscar D. Robles et. al. Proposed the two new primitives for representing the content of a video. These primitives are used in the content based video retrieval system the techniques presented in the paper titled "Towards A Content-Based Video Retrieval System Using Wavelet-Based Signature". First a multi-resolution representation is computed using the Haar Transform. Then two types of signatures are extracted from the multi-resolution representation those two signatures are: one based on multi-resolution global color histograms and the other one based on multi-resolution local color histograms. The tests performed in the experiments include the recall and precision measure achieved with the proposed primitives.

[2] In this survey paper described about video retrieval process. Different algorithms for video retrieval on content basis are explained such as SIFT algorithm, SURF algorithm. The framework of content based video retrieval system is illustrated and results are evaluated and compared.

[3] In this research article presented on video mining and data mining. This report Provides the brief information about the video mining and its applications.

[4] Video Retrieval Based on Textual Queries presented an approach that enables search based on the textual information present in the video. Regions of textual information are indentified within the frames of the video. Video is then annotated with the textual content present in the images.

[5] Automatic Content-Based Retrieval and Semantic Classification of Video Content presented a learning framework where construction of a high-level video index is visualized through the synthesis of its set of elemental features. This is done through the medium of support vector machines (SVM). The support vector machines associate each set of data points in the multidimensional feature space to one of the classes during training.

[6] Work presented in Fast Video Retrieval via the Statistics of Motion Within the Regions-of-Interest deals with very important issue to quickly retrieve semantic information from a vast multimedia database.

III. SYSTEM ARCHITECTURE

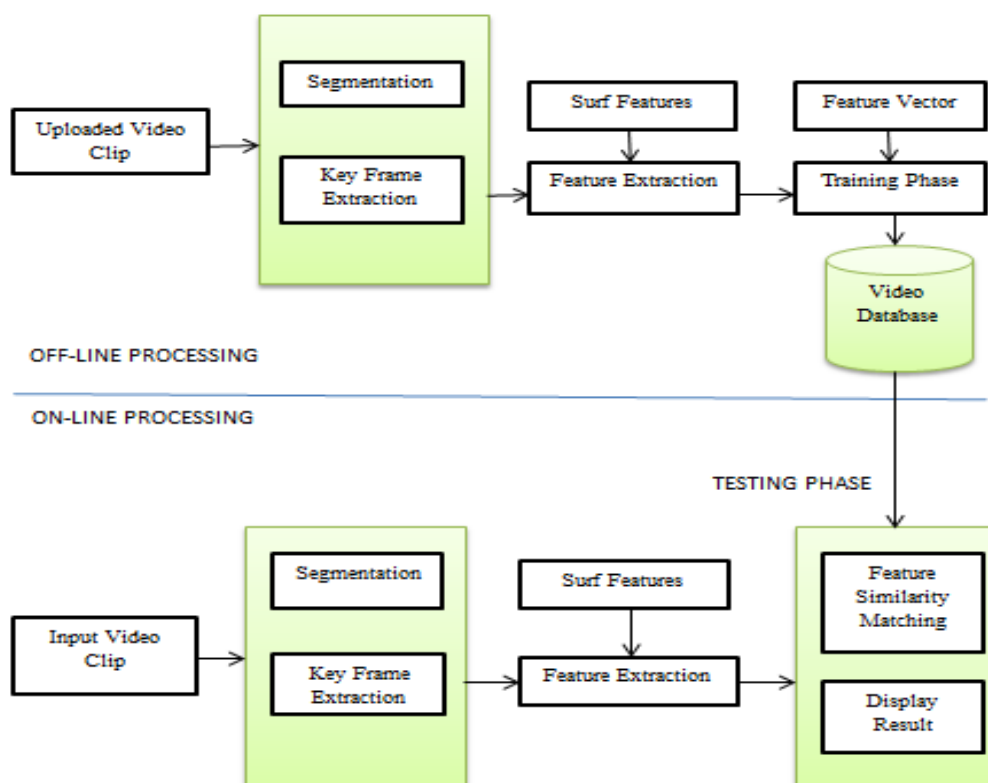


Figure: Content Based Video Retrieval System

In offline processing stage, the video warehouse is created by the system administrator by uploading various types of videos into the video warehouse. Different types of videos such as sports video clips, movie video clips, surveillance video clips etc. can be uploaded with different types of video file extensions such as .mp4,avi. In online processing stage, video extraction will be performed by the user and specified or matched videos with an input query get extracted from the video warehouse.

As shown in above figure during the offline processing stage, first all videos in video database undergoes a preprocessing phase, which includes Segmentation, Key Frame extraction modules. During this preprocessing stage, the input video gets converted into a set of key frames. From these identified key frames, video features are extracted using feature extraction algorithm and feature vector is created. This feature vector is then passed into a training phase. Next in online processing stage, for a given input query image or clip to retrieve the video, feature vector of input query is computed. Then similarity matching is performed between the feature vector of input query and feature vector of stored videos in video database. From the list of similar videos the highest ranking videos are retrieved from the video warehouse.

IV. FLOW OF THE SYSTEM:

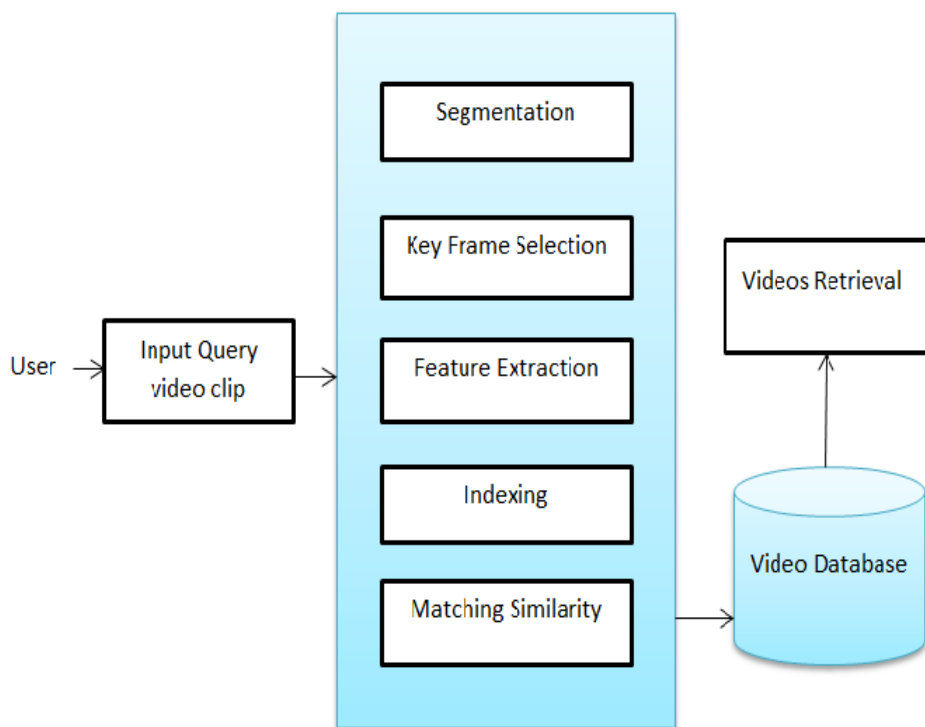


Figure: Execution Flow of the System

The above figure shows the flow of system; in this system user will interact with the video retrieving system. The system also interacted with video database, the video data stored in video database. The system performs various operations on input video clips these are segmentation, key frame selection, feature extraction, indexing and matching similarity by using various algorithms. These features are matched with the features stored in video database and then user gets the final retrieved result from video database.

A. Video Segmentation

The first step in any video data management system is invariably, the segmentation of the video track into smaller units. The process of breaking a video into smaller units is known as video segmentation. The complete video is first converted into scenes, then scenes are converted into shots and finally shots are converted into various frames.

- **Video** It refers to multimedia sequences comprised of both sound and a series of images.
- **Scene** A scene or sequence is formally defined as a collection of semantically related and temporally adjacent shots, depicting and conveying a high-level concept or story.

- **Shot** It is defined as a sequence of frames recorded contiguously and representing a continuous action in time or space.
- **Key frame** The most representative frame of a shot is called a key frame. The frame represents the salient visual contents of a shot.

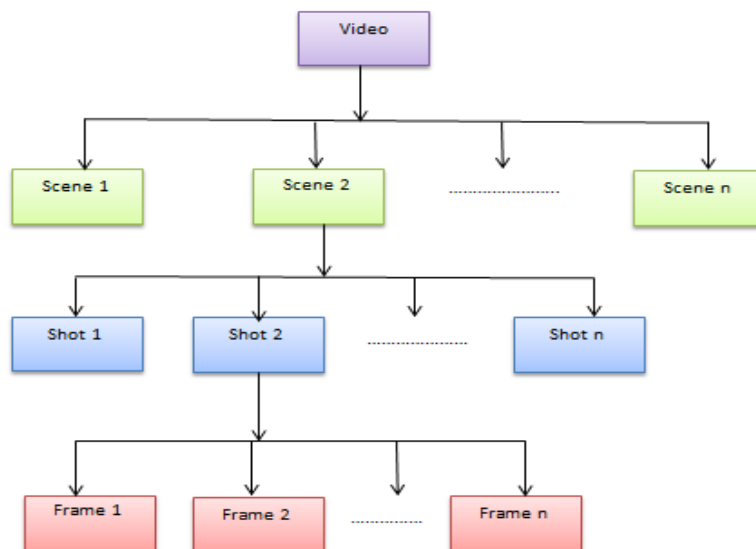


Figure: Video Segmentation

B. Key-Frame Selection

One or more key frames can be extracted from the shot depending on the complexity of the content of the shot. Certain frames that best reflect the shot contents are selected as key frames. Key frame is more informative about the shot.

C. Feature Extraction

Different types of features can be extracted from the key frames. The Spatial features such as color, edge and shapes and Temporal features such as motion and audio can be extracted and represented as feature descriptors.

D. Indexing

Video indexing is a process of tagging videos and organizing them in an effective manner for fast access and retrieval. Automation of indexing can significantly reduce processing cost.

E. Matching Similarity

Similarity matching performed between two feature vectors. Feature vector of input video clip and feature vector of stored videos in video database. The matched videos are then retrieved from the video warehouse and given to the user.

V. RESULTS

User can retrieve specific videos from video warehouse based on content of the video in different ways that is by an image, by short video clip, by real time video clip and by an audio clip. This process can be implemented in MATLAB tool by creating easily accessible GUI. If user gives an input query as an image, the videos which consists that inputted image will be retrieved. If the user gives input query as a short video clip then the highly matched videos with the input video clip in video database is get retrieved. If the user gives input query as real time video clip, the related and matched videos in video database are extracted. If the user gives an audio clip as an input query then the videos containing that audio will be retrieved from the video warehouse.

VI. CONCLUSION

This paper presented the video retrieval processing steps and information about the content based video retrieval system. Content based video retrieval system will retrieve videos from the video database efficiently and works better than the traditional video retrieving methods. Video extraction will be performed by using different algorithms.

VII. REFERENCES

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