FINDING INTERESTING PATTERNS IN VIDEO DATA USING IMAGE SEGMENTATION TECHNIQUE

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ABSTRACT

Data mining, a branch of computer science and is the process of extracting patterns from data. Data mining is seen as an increasingly important tool by modern business to transform data into business intelligence giving an informational advantage. It is currently used in a wide range of profiling practices, such as marketing, surveillance, fraud detection, and scientific discovery. The purpose of video data mining is to discover and describe interesting patterns in data. audio content, because of the need to analyze enormous volumes of multidimensional data. The task becomes especially tricky when the data consist of video sequences. This paper investigates video data technologies The concepts, technical approaches and application of video data mining are discussed.

Key Terms: Video data mining, Object mining, clustering, video sequences, Data mining.

1. INTRODUCTION

With the development of multimedia and web technology, the multimedia data, including image, audio and video, have been produced massively. Digital video rapidly becomes an important source for information, education and entertainment. It is needed urgently the advanced technologies for organizing, analyzing, representing, indexing, filtering, retrieving and mining the vast amount of videos to retrieve specific information based on video content effectively, and to facilitate new and better ways of entertainment and multimedia applications. Content-base video analyzing and retrieval are important technologies, which have been an international research focus in recent ten years. As challenging problem, content-based video mining is also emphasized by lots of researchers. Although numerous papers have been published on data mining , few of them deal with video mining directly . Low features, such as color, texture, audio and motion, can be used to segment video sequence into shots and to extract caption or other region of interest for video data management and retrieval. However, the mining of video data based on its content is still in its infancy. Due to the inherent complexity of video data, existing data mining algorithms and techniques can not be used directly in video data. The new mining techniques or modified ones should be designed to facilitate the video data mining process.

Video retrieval has been a fast growing research area in the recent few years. Despite the substantial amount of research, video retrieval is still a difficult task other than for highly structured video. Accessing and retrieving relevant video segments from Unstructured video becomes especially important for electronic chronicles. Video retrieval from ubiquitous environments poses additional challenges. Larger and more real-life environments with a large number of cameras are being built. The amount of video is large, and increasing with time. The content is much less structured compared to a single video from a specific category. Retrieval is required at multiple levels of granularity, not merely as a summary. One difficult task in video retrieval from ubiquitous environments is to retrieve video that corresponds to a particular person, or event. Switching between videos from multiple cameras to show a particular person, we call *video handover*, is challenging. Given the large amount of image data and the current state of the art of image processing algorithms, it is evident that video retrieval based solely on image data is a difficult task. Therefore it is desirable to make use of supplementary data from other sensors for easier retrieval.

2. IMPRESSIONS OF VIDEO MINING

After the concepts and approaches of data mining melt into multimedia, literatures about multimedia data mining are published gradually. E.g., medic image mining, typhoon image mining , mining cinematic knowledge , multimedia data mining for traffic video sequences. Some research organizations of video mining .Based on our investigation, to date, the following organizations have done deeper work on video mining.

(1) DIMACS Workshop. DIMACSI play a national leadership role in the development, application and dissemination of the inteiTelated fields of discrete mathematics and theoretical computer science. Most participants considered video mining as sophisticated video understanding techniques for fast and efficient content-based analysis of video streams.

(2) MIERL-. The researchers consider the video mining problem in the light of existing data mining techniques [12]. Their approaches to video mining are to think of it as "blind" or content-adaptive processing that relies as little as possible on a priori knowledge. The processes of video mining are first to extract the features of video content, and then use adaptively constimicted statistical models of usual events to discover unusual audio-visual pattems.

(3) Computer & Information Science Department of Temple University3. They think video mining is extracting information from video data using image and video processing techniques. E.g.: detecting special events, finding the similar video clips. They hold a curriculum named video process and mining from 2003, which talking about objects detection, tracking, events recognition and video content analysis [13].

(4) DVMMlab4 of Columbia University. They give attention to mining periodic patterns from semantic video events from 2001. They think video patterns are multilevel, from features to events, which can be discovered by using hierarchical hidden Markov models, cluster- or statistical methods..

3. NECESSITIES OF A VIDEO MINING STRUCTURE

The following requirements for a video mining system:

I . It should be unsupervised.
2. It should not have any assumptions about the data.
3 It should uncover interesting events

Note that requirements 2 and 3 are somewhat contradictory, since the notion of “interesting” is subjective, and highly dependent on knowledge of the content. We therefore relax requirement *2* by aiming for having as few assumptions as possible. The range between purely unsupervised and purely supervised techniques can be thought of as a continuum that goes from the general *to* the particular. Our aim is to find out how few assumptions we can make about the content without detecting events that are too general to be meaningful.

4 ASSOCIATED EFFORT IN VIDEO DATA MINING

There exists a fair amount of research on video retrieval, most of the work deals with specific content. Examples are sports video summarization and analysis of news . Most of the existing works use audio or text as a supplementary input for retrieval. Life log video captured by a wearable camera has been dealt with by using supplementary context information. Context such as location, motion, time etc. is used for retrieval.

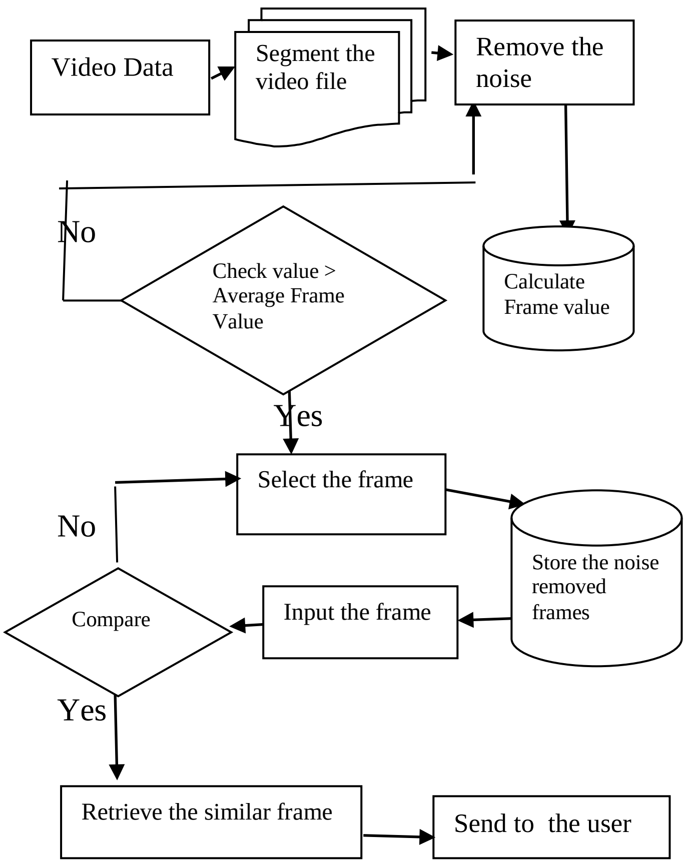

Figure 1. Proposed Architecture for Video segmentation process.

4.1 VIDEO PREPROCESSING

To apply existing data mining techniques on video data, one of the most important steps is to transform video from non relational data into a relational data set. To facilitate this goal, we adopt a series of algorithms to explore audio and visual cues. We start with a raw video sequence and output symbolic sequences that indicate where and what types of cues appear in the video.

4.2. VIDEO SHOT DETECTION AND CLASSIFICATION

Physical video shots that are implicitly related to content changes among frames are widely used in various video database systems To support shot-based video content access, we have developed a shot cut detection technique, which uses color features in each frame to characterize content changes among frames. The boundaries of shots are then determined by a threshold that is adjusted adaptively by using a small window (30 frames in our current work). After shot segmentation, we try to classify each shot into two categories: court and non court. We first cluster visually
Similar shots into groups and then use the dominant color to identify groups which consist of court field shots because the court field in most sports can be described by one distinct dominant color

4.3 SEARCHES FOR SIMILAR VIDEOS

The goal of the search step is to find videos with content similar to that in the query, such that the words associated with the search results inform the original video. Video search is a well-studied topic, and the performance of the annotation will advance as video search improves. Most existing video search systems rely on some combination of transcript, key frame, and concept detection similarities. This paper proves that using current search algorithms, mining of the search results can yield information useful for the original. Intuitively, it would seem the algorithm is robust to significant noise as irrelevant search results will all be different while relevant results will share commonalities that are extracted in the mining step. However, experiments presented in this paper will reveal that this expectation is true only to a limited extent, as the irrelevant search results are not random noise but are correlated in some way. The search performed in this paper has several different modalities, based on image, text, concepts, and combinations of those modalities..

1. Image alone, where global image features rank shots. This modality is also called query by example, or QBE.
2. Text alone, where ASR/MT transcripts rank shots.
3. Concepts alone, where scores from SVM models for 39 TRECVID concepts rank shots.
4. Average fusion of text and image modalities.
5. Linear fusion of text and concept modalities.
6. Average fusion of text, image, and concept modalities.

4.4 IMAGE SEGMENTATION:

Segmentation refers to the process of partitioning a digital image into multiple segments (sets of pixels, also known as superpixels). The goal of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze.[The result of image segmentation is a set of segments that collectively cover the entire image, or a set of contours extracted from the image (see edge detection). Each of the pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, or texture. Adjacent regions are significantly different with respect to the same characteristic

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5. EXPERIMENTAL OUTCOMES:

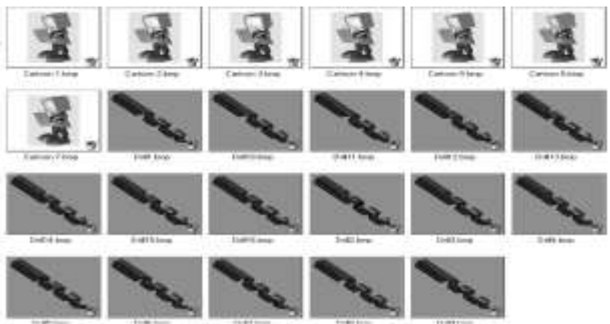


Figure 2 Cartoon frame segmentation.

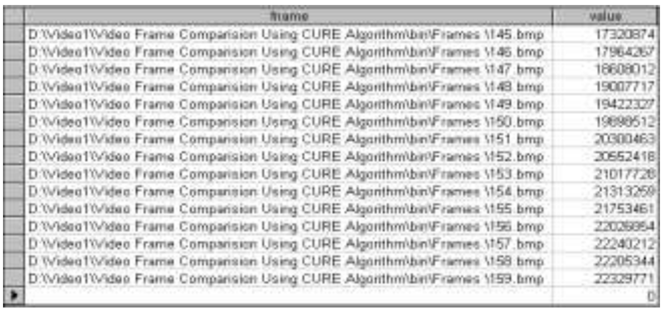
Figure 3Video song segmentation process

Figure 4 News video semifermentation

Table 1. Frame counts

Duplicate Elimination:

Video name	Number of Input frames	Number of output frames	Duplicate frames removed
Cartoon	5	8	2
Graphics	18	13	4
Meeting	12	11	2
Natural Scene	14	10	2
Song	15	11	3



frame	value
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \145.bmp	17320874
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \146.bmp	17964267
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \147.bmp	18608012
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \148.bmp	19007717
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \149.bmp	19422327
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \150.bmp	19898512
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \151.bmp	20300463
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \152.bmp	20652418
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \153.bmp	21017728
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \154.bmp	21313259
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \155.bmp	21753461
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \156.bmp	22026864
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \157.bmp	22240212
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \158.bmp	22205344
D:\Video1\Video Frame Comparision Using CURE Algorithm\bin\Frames \159.bmp	22329771
	0

Figure 5. Frame Pixel calculation process

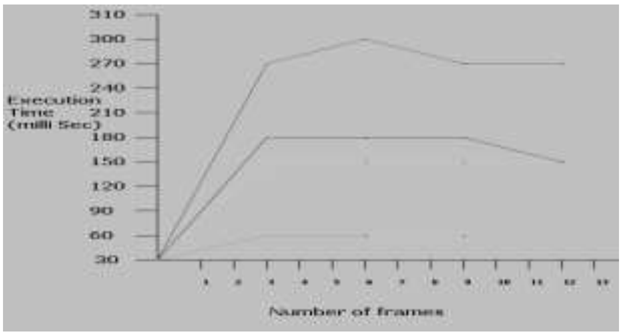


Figure 6. Performance Graph of Frame segmentation of various video files

6. APPLICATIONS

Some of the practical applications of image segmentation are:

1. Medical Imaging
2. Locate tumors and other pathologies
3. Measure tissue volumes
4. Computer-guided surgery
5. Diagnosis
6. Treatment planning
7. Study of anatomical structure
8. Locate objects in satellite images (roads, forests, etc.)
9. Face recognition
10. Fingerprint recognition
11. Traffic control systems
12. Brake light detection
13. Machine vision
14. Agricultural Imaging- crop disease detection

7. CONCLUSIONS

This paper attempts to give a clear concept for video mining. The feasible approaches and possible applications of video mining are discussed as well. We should point out that. The content status of video mining is very premature due to the non-structured nature of video data. Although the Research of video mining is at the elementary stage, many concepts and approaches are coming into being. Applications of video mining techniques are wide and promising. We believe that a lot of approaches and systems of video mining would appear and consummate continuously with further study.

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