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Research Article

ADAPTIVE FRAME FEATURES BASED VIDEO FOOTAGE RETRIEVAL SYSTEM

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ABSTRACT
Due to high dimensionality of video data, video mining becomes tedious task for any search engine. It requires lot of computation on account of multiple and nested loops and that too at high speed. This makes the computational task very expensive in terms of programming performance like speed of operation and code size etc. However, if the video sequences are stored based on contents like color, texture, or events, then the video mining may be speed up to a great extent. In the presented work, the color based and identical things (or repetitive things) in continuous frames based, video mining is proposed for speedy search at fair accuracy. In the proposed work, recorded video is scanned based on query contents like color (fire) by decomposing the video into frames. A video sequence is a collection of no. of 2-d images played over a time dimension. The 2-d frame are analysed for color based features contents and integrated with period of time so that complete video is scanned for the presence of color in the video sequence. The same concept may be applied for other features like shape, motion artifact. The video frames are decomposed into frames using time based images frames extractions. The time interval may be decided based on gravity of the feature like color in case of fire and motion.

Keywords: *Retrieval Techniques, Similarity Measures*

INTRODUCTION
With recent advances in multimedia technologies, digital TV and information highways, more and more video data are being captured, produced and stored. It is the media which uses various forms of information content and information processing on text, audio, graphics, animation, videos to entertain the user. A multimedia broadcast can be a live or recorded multimedia. Multimedia broadcasts and recordings can be presented in the forms such as analog and digital representation. Digital online multimedia may be downloaded. Multimedia can be live or on-demand.
However, without appropriate techniques that can make the video content more accessible, all these data are hardly usable. So the research on the management of video data is now a hot field.
Video content can be grouped into two levels: low-level visual features and high-level semantic content. Low-level visual content is characterized by visual features such as colour, shapes, textures, etc; On the other hand, semantic content contains high-level concepts, such as objects and events. Because it is difficult to map the low-level features to semantic content, currently, most video retrieval systems rely on low-level features and video annotations.
However, the dimensional of the feature vectors is normally of the order of 100 for video data. So dimension reduction and multidimensional indexing techniques must be used to quicken the query and retrieval processing.
To transfer data efficiently there are some key issues which needs to be considered such as to store and represent the data or required information temporally, to maintain the information on playback. Data should be represented in digital form for all such requirements the desirable features should be modulated so as to meet the requirements. There are many methods purposed till date to extract desirable features of multimedia

Related Work
One of the novel schemes for content-based video retrieval by exploring the spatio-temporal information is with significant content changes can be segmented into several sub shots that are of coherent content,

and shot similarity measure for video retrieval that can be computed from the similarities between corresponding sub shots. To characterize the temporal content variations in one shot, it develops two descriptors: Dominant Color Histograms (DCH) and Spatial Structure Histograms (SSH) (Tong *et al.*, 2001).

Content-based video retrieval is a proper solution to handle the video data. But because of their huge volumes and high dimensionality, finding a proper way to organize them for efficient search and retrieval becomes a challenging and important problem. In this paper, this framework for content-based video retrieval using the Shot Cluster Tree, while the latter organizes the content of shots in the tree structure (Cheng and Xu, 2003).

It aims to efficiently retrieve various kinds of events (e.g. conversation, battle, run/walk and so on) from a video archive. To this end, we construct a "video ontology" which is a formal and explicit specification of events. Specifically, an event is modeled to have 4 dimensions of semantic contents (i.e. Action, Location, Time and Shooting Technique) (Kimiaki *et al.*, 2007).

The inherent nature of image and video and its multi-dimension data space makes its processing and interpretation a very complex task, normally requiring considerable processing power. Moreover, understanding the meaning of video content and storing it in a fast searchable and readable form, requires taking advantage of image processing methods, which when running them on a video stream per query, would not be cost effective, and in some cases is quite impossible due to time restrictions (Yang, 2009).

It presents a novel Content Based Video Retrieval (CBVR) system, driven by free-hand sketch queries depicting both objects and their movement. Its main contribution is a probabilistic model of video clips based on Linear Dynamical Systems, leading to an algorithm for matching descriptions of sketched objects to video (Collomosse *et al.*, 2009).

Traditional video search engines retrieve the results on the basis of correspondence between users textual query and tags associated with the videos. Only that content that matches the tags is returned as a result to the user. Given the ever increasing immensity of videos on the internet, especially those with zero or irrelevant tags, such traditional methodology has eventually led to rise in ratio of missing important context. Content based searching within a video library is definitely an alternative solution but it requires time consuming computations and comparisons which renders exhaustive search. The purpose of this paper is to provide It provides an efficient methodology that will lead to incremental improvement in the video search results against a users query image. It employs Particle Swarm Optimization (PSO), an evolutionary population based search algorithm, to look for frames within the video library (Salahuddin *et al.*, 2012).

Algorithm

The proposed algorithm includes following steps:

Video Footage Acquisition

Conversion of video footage into 2-d frames i.e. image format. Present the video frames as images for frames retrieval based on query features like color, entropy, texture and time based activities.

Video Footage Retrieval based on Color

When the video footage is to be retrieved based on some color, the query color is first indexed using the CAT command in matlab.

Say, the query color is C, then, C may be decomposed into its RGB component using the index color coding. Say the RGB components are given by:

R-Component = R/256;
G-Component = G/256;
B-Component = B/256;

The color components are divided by 256 to make the color components in the range of 0-1.

The query color is obtained by the followings:

Query Color C = cat (R-Comp, G-Comp., B-Comp);;

A RGB histogram is extracted from the data base images by decomposing the images into index images. A Color Check Margin (CCM) or threshold is defined and if the query color components (R-, G- and C-)

are greater than the CCM in data base images, those images are presented to the user. The algorithm has been implemented in matlab and works fine. The CCM is programmable and can be fined tuned according to the applications.

Video Footage Retrieval based on Texture

The texture based features are extracted from the database images and stored in a feature database. Similarly, the texture based features are extracted from the query image and the query image features are compared with the database image features using the distance measure. Images having the least distance with the query image are displayed as the result. Image Texture features are extracted using Gray Level Co-occurrence matrix (GLCM). The GLCM finds how often a pixel with a gray-level value i occurs either horizontally, vertically, or diagonally to adjacent pixels with the value j. It is given by the relative frequency of the occurrences of two gray-level pixels i & j, separated by d pixels in the θ orientation, where d is the displacement and θ is the direction. The 'd' can take values 1, 2, 3, etc., and θ can take values 0° (horizontal), 90° (vertical), 45° and 135°.

Video Footage Retrieval based on Shape

The shape based features are extracted from the database images and stored in a feature database. Similarly, the shape based features are extracted from the query image and the query image features are compared with the database image features using the distance measure. Images having the least distance with the query image are displayed as the result.

Video Footage Retrieval based on Entropy

The entropy is extracted from the database images and stored in a feature database. Similarly, the entropy is extracted from the query image and the query image features are compared with the database image features using the distance measure. Images having the least distance with the query image are displayed as the result. Image. E = entropy(I) returns E, a scalar value representing the entropy of gray scale image I. Entropy is a statistical measure of randomness that can be used to characterize the texture of the input image.

Video Footage Retrieval based on Wavelet Coefficients

In this approach, the query and data base images are decomposed using the haar wavelet in four sub-bands namely LL, LH, HL and HH sub-bands. The LL sub-band contains the maximum energy/entropy i.e. maximum information part, however, other sub-bands contain the information about the high frequency components like edges, sharp changes etc. Further, this information's are statistically analysed in order to generate a content based vector set and stored in a data base. Based on these vector set search, the images could be retrieved in at fast pace.

For the image decomposition and feature extraction the Haar transform has been applied as a basic tool used in the wavelet transform. The method described is used for description of the whole system enabling perfect image reconstruction. The proposed algorithm of the Haar wavelet image decomposition includes image feature based segmentation and comparison of results with the watershed transform. Individual methods have been verified for simulated images and then applied for processing of selected magnetic resonance biomedical images.

RESULTS AND DISCUSSION

The presented approach is implemented in matlab version 7.5, The algorithm has been tested on a number of videos having different clips of certain duration. The video clips or sequences were retrieved based on features like entropy, color, and time based activities. The retrieval approach or methodology is required to be more users interactive so that the actual through of the system is achieved in a more transparent manner. Further, a time based activity has been introduced in the proposed scheme. The time based activity monitoring is the most crucial and interesting part of the work. This gives a unique video retrieval as the rate of change of a particular activity could be monitored in a very efficient way and too without losing any sequence from the large video data base.

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