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CONTENT BASED VIDEO RETRIEVAL AND ANALYSIS USING IMAGE PROCESSING: A REVIEW

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Abstract

Content based video retrieval and analysis is the one of the most important and recent research area in the Image processing domain. Content based video retrieval means whatever the input is given by the user based on that input, we will take video and analyze that video, actually what we have to analyze in that video is features of the video like texts, images, colors, content of the video and image movements in that video etc. 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 methods are applied in order to improve the effectiveness of the content based methods. And these methods can play essential rules which are used in media collection and enhance retrieval accuracy. Similarly we will study the other topics like content based image retrieval and document based image retrieval to comparing these topics content based video retrieval is little bit difficult and complex topic. A 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: CBVR, video retrieval, shots, feature extraction.

I. Introduction

Developed by academic institutes such as Photobook, Netra, Visualseek and Chabot to check new technologies. In the context of multimedia, information retrieval such as images, text, audio or videos is an open research area. Various methods have been discovered to retrieve the effective and accurate information. Basically, there are two retrieval methods, which are: text based information retrieval and content based video retrieval. The First method is the text based retrieval- in which the images and videos are manually annotated with keywords or descriptors [1]. Most of the search engines on the internet like Google tend to find the multimedia information by searching the textual labels attached with the multimedia data. The keywords are attached to the multimedia data in such a

way that they tend to best describe the image or video itself based on their properties. Second method is content based information retrieval, which deals with retrieval of images or videos based on their visual contents from large database of videos. With the help of content based video retrieval, the user is able to retrieve important clips of video based on his demands rather than watching the whole video. So, content based video indexing and retrieval is promising area of research. There are three levels to describe visual features of image or video described below:

Low level description

Middle level description

High level description

Low level description of the visual contents is based on color, texture and shape features. The low level visual features of an image are directly related to the image content. Next level is the middle level description which is concerned with the background and spatial attributes of the concerned object. The high level feature representation is dealing with human brain and perception. Examples are events, scenes and human thinking such as emotions [3]. This type of description is very difficult to map to some mathematical model. A lot of work has been done in the field of content based image and video retrieval systems. Some of the important commercial systems are QBIC, Excalibur, and Virage. Experimental CBVR systems have also been developed by academic institutes such as Photobook, Netra, Visualseek and Chabot to check new technologies. Content based Video Indexing and Retrieval (CBVIR), in the application of image retrieval problem, that is, the problem of searching for digital videos in large databases. "Content-based" means that the search will analyze the actual content of the video. The term 'Content' in this context might refer colours, shapes, textures. Without the ability to examine video content, searches must rely on images provided by the user [4]. Although the term "search engine" is often used indiscriminately to describe crawler-based search engines, human-powered directories, and everything in between, they are not all the same. Each type of "search engine" gathers and ranks listings in radically different ways. Crawler-based search engines such as Google, compile their listings automatically. They "crawl" or "spider" the web, and people search through their listings [2]. These listings are what make up the search engine's index or catalog. One can think of the index as a massive electronic filing cabinet containing a copy of every web page the spider finds. Because spiders scour the web on a regular basis, any changes made to a web site may affect search engine ranking. It is also important to remember that it may take a while for a spidered page to be added to the index. Until that happens, it is not available to

those searching with the search engine. Directories such as Open Directory depend on human editors to compile their listings. Webmasters submit an address, title, and a brief description of their site, and then editors review the submission. The hybrid search engines will typically favor one type of listing over the other however.

The first step for video-content analysis, content based video browsing and retrieval is the partitioning of a video sequence into shots. A shot is defined as an image sequence that presents continuous action which is captured from a single operation of single camera. Shots are joined together in the editing stage of video production to form the complete sequence. Shots can be effectively considered as the smallest indexing unit where no changes in scene content can be perceived and higher level concepts are often constructed by combining and analyzing the inter and intra shot relationships.

Key-frames are still images extracted from original video data that best represent the content of shots in an abstract manner. Key-frames have been frequently used to supplement the text of a video log, though they were selected manually in the past .Key-frames, if extracted properly, are a very effective visual abstract of video contents and are very useful for fast video browsing. A video summary, such as a movie preview, is a set of selected segments from a long video program that highlight the video content, and it is best suited for sequential browsing of long video programs. Apart from browsing, [5] key-frames can also be used in representing video in retrieval video index may be constructed based on visual features of key-frames, and queries may be directed at key-frames using query by retrieval algorithms.

Once key frames are extracted next step is to extract features. The features are typically extracted off-line so that efficient computation is not a significant issue, but large collections still need a longer time to compute the features. Features of video content can be classified into low-level and high-level features.

Low-level features such as object motion, color, shape, texture, loudness, power spectrum, bandwidth, and pitch are extracted directly from video in the database. Features at this level are objectively derived from the media rather than referring to any external semantics. Features extracted at this level can answer queries such as "finding images with more than 20% distribution in blue and green color," which might retrieve several images with blue sky and green grass. Many effective approaches to low-level feature extraction have been developed for various purposes.

II. Existing system:

Texture Features

Texture can be defined as the visual patterns that have properties of homogeneity that do not result from the presence of only a single color or intensity, including coarseness , contrast, directionality, line-likeness, regularity and roughness, to describe various texture properties.

Color Features

Color is one of the most widely used visual features in multimedia context and image / video retrieval, in particular. To support communication over the Internet, the data should compress well and be suitable for heterogeneous environment with a variety of the user platforms and viewing devices, large scatter of the user's machine power, and changing viewing conditions [7]. The CBIR systems are not aware usually of the difference in original, encoded, and perceived colors, e.g., differences between the colorimetric and device color data.

Color Descriptors

Color descriptors of images and video can be *global* and *local*. Global descriptors specify the overall color content of the image but with no information about the spatial distribution of these colors [6]. Local descriptors relate to particular image regions and, in conjunction with geometric properties of these latter, describe also the spatial arrangement of the colors. In particular, the MPEG-7 color descriptors consist of a number of histogram descriptors, a dominant color descriptor, and a color layout descriptor (CLD).

Color histograms

To build the color histogram, the image colors should be transformed to an appropriate color space and quantized according to a particular codebook of the size *K*.

Color Correlogram

A color correlogram of an image is a table indexed by color pairs, where the k-th entry for (i ,

j) Specifies the probability of finding a pixel of color at a distance from a pixel of color in the image. Such an image feature turns out to be robust in tolerating large changes in appearance of the same scene caused by changes in viewing positions, changes in the background scene, partial occlusions, camera zoom that causes radical changes in shape, etc.[8]. This feature distills the spatial correlation of colors, and is both effective and inexpensive for content-based image retrieval. The correlogram robustly tolerates large changes in appearance and shape caused by changes in viewing positions, camera zooms, etc. The color correlogram is neither an image partitioning method nor a histogram

refinement method. Unlike purely local properties, such as pixel position, gradient direction, or purely global properties, such as color distribution, correlograms take into account the local colour spatial correlation as well as the global distribution of this spatial correlation.

III. Proposed work:

Previously they have implemented only document image retrieval and analysis and now in this research paper planning to implement the document video retrieval and analysis. Here whatever the data stored in the database based on that data user can give any input based on the that input it can retrieve the video from the database data and user can observe the video features like colour, text, images, moving objects etc.,

Based on the below diagram user can easily understand the concept of document based video retrieval and analysis.

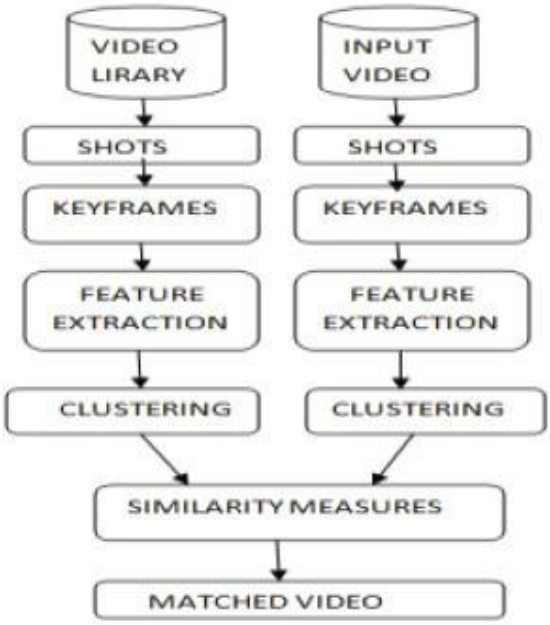

Fig: Proposed system.

In the above diagram user can select the object and some shots then they will upload that shots based on the shots it will takes the video and that video can be analyzed by the user according to their requirement.

IV. Features Extractions

Color Extraction: Color descriptors of images and video can be *global* and *local*. Global descriptors specify the overall color content of the image but with no information about the spatial distribution of these colors.

Shape Feature: A common approach is to detect edges in images and then describe the distribution of the edges using a histogram. Use the edge histogram descriptor (EHD) to capture the spatial distribution of edges for the video search.

Texture Feature: In LBP operator method, the image is divided into a set of blocks and for each block, the LBP operator labels the pixels by applying threshold operation over the 3x3-neighborhood of each pixel with the center value.

Clustering: Suppose we don't have a clear idea how many clusters there should be for a given set of data. Subtractive clustering is a fast, one-pass algorithm for estimating the number of clusters and the cluster centers in a set of data.

V. Conclusion

Despite the considerable progress of academic research in video retrieval, there has been relatively little impact of content based video retrieval research on commercial applications with some niche exceptions such as video segmentation. Choosing features that reflect real human interest remains an open issue. One promising approach is to use Meta learning to automatically select or combine appropriate features. Another possibility is to develop an interactive user interface based on visually interpreting the data using a selected measure to assist the selection process. Extensive experiments comparing the results of features with actual human interest could be used as another method of analysis. Since user interactions are indispensable in the determination of features, it is desirable to develop new theories, methods, and tools to facilitate the user's Involvement.

Future Enhancement

In this paper have studied the different papers related to document based video retrieval and analysis in future will implement the how to retrieve data from databases by using different data and shots from the data bases.

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