International Journal of Modern Trends in Engineering and Research
www.ijmter.com
e-ISSN No.:2349-9745, Date: 2-4 July, 2015

QUERY BY EXAMPLE BASED VIDEO RETRIEVAL SYSTEM

Miss B. S. Lalwani
Computer engineering, SNJB's COE, Chandwad,bhagyashri.lalwani@gmail.com

Abstract—Query by example based video retrieval aims at automatic and easily retrieval of video samples which are similar to a user-provided example from video database. Considering the much of prior work on video analysis support, retrieval of videos using text queries are most common. Also the given text queries must be as much descriptive to retrieve the most relevant video. In the proposed method, a set of visual features like color and texture are extracted from key frame level analysis. And then those visual features are applied to refine retrieval and the similar/relevant videos are provided to user based on ranking. This way the need of descriptive text based query search is eliminated and also works for the searching of the videos which are not having much keywords or known words to search for it.

Keywords- Video, Video Retrieval, Key-Frame, Key-Frame analysis, Feature Extraction, Query-By Example.

I. INTRODUCTION

The matching of some stated user query against a set of free-text records is known as Document retrieval. These records could be any kind of mainly free text, such as real estate reports, paragraphs in a manual or newspaper articles. The searching queries by users can range from multi-sentence full descriptions of an information need to a few words. Document retrieval is a branch of, Text Retrieval, where text retrieval is a branch of information retrieval. The information is stored mainly in the form of text. Text databases became decentralized. Text retrieval is the fundamental basis of all internet search engines so it is a significant area of study today [1].

A video retrieval system is a computer system for browsing, searching and retrieving video from a large database of videos. Most traditional and common methods of video retrieval utilize some method of adding metadata such as captioning, keywords, or descriptions to the videos so that retrieval can be performed over the annotation words. Manual video annotation is time-consuming, tedious and expensive; to deal with this, there has been a large amount of study done on automatic video annotation. Additionally, the increase in social web applications and the semantic web have inspired the development of several web-based images and videos annotation tools [2]. Retrieval of relevant videos from large video databases has enormous applications in various domains. Retrieval from broadcast news video database is crucial for effective information access. The presence of textual captions and audio, complementing the appearance information of video frames, enables building automated retrieval systems. The information about the song and performer, present in the form of text captions enables searching in albums of an artist, a genre of songs. These techniques can also uses in digital libraries of video clips of lectures for distance learning applications.

Content-based search and retrieval of video data has become a tricky and significant issue. Video contains several types of audio and visual information which are difficult to extort, combine or trade off in common video information retrieval. This is the enhanced version of previous research with texture feature extraction. In CBVR, the video is splits into a sequence of elementary shots and extracts a small number of representative frames from each shot and subsequently calculates frame descriptors depending on some features like Motion, Edge, Color and Texture features.

In query by example the element used to search is a multimedia content (image, audio, and video). In other terms, the query is can be said to be a media. Often it's used audiovisual indexing.
It will be necessary to choose the criteria we are going to use for creating metadata. The searching process can be divided in three parts:

1. Generate descriptors for the media which we are going to use as query and the descriptors for the media in our database
2. Compare descriptors of the query and our database's media.
3. List the media sorted by maximum coincidence [3].

The remainder of this paper is organized as follows:
Section II review the Literature survey, Section III gives the mathematical modeling of the system, Section IV shows the implementation of system, Section V concludes the system and focuses on future scope

II. LITERATURE SURVEY

A generic approach for managing video data is first to segment a video into groups of related frames called "shots" by means of shot detection or scene break detection [4] [5]. After identifying the shot boundaries, one or more key frames or representative frames can be extracted for each group of frame (GOF) or video shot. The visual contents of these key frames are then used to represent the video shots for indexing and retrieval [6]. Key frame selection is therefore an important procedure for video management. Paul Browne and Alan F. Smeaton [7] provide Video Retrieval Using Dialogue, Key frame Similarity and Video Objects. This is a System providing retrieval from an achieve of video using any combination of text searching, key frame image matching, shot-level browsing, as well as object-based retrieval. The system is driven by user feedback and interaction rather than having the conventional search/browse/search metaphor and the purpose of the system is to explore how users can use detected objects in a shot as part of a retrieval task. Lee and king propose is suitable for both frame by frame sequence representation and symbol, with the symbols in the string drawn from a comparison, and for shot-by-shot comparisons, and accounts for special features and edit operations needed for video sequence. According to the surveyed content-based retrieval for multimedia database reference to multimedia database is done in a broad sense; this included retrieval of contents associated with a single type of non-textual data as a part of multimedia data retrieval. As discussed in this literature, there are two principal ways for the representation of queries, namely, 'query-by-subject/object' and 'query-by- example'.

Table 1. Existing Retrieval Systems[5]

System	Video	Image	Firm
QBIC	-	YES	IBM US
VIRAGE	-	YES	VirageInc US
CHABOT	-	YES	UC Berkely US
CANDID	-	YES	Los Alamos National Lab US
PHOTOBOOK	-	YES	MIT US
VisualSEEK	-	YES	Columbia University US
CVEPS	YES	-	Columbia University US
JAKOB	YES	-	University of Palermo IT
VISION	YES	-	University of Kansas US
SWIM	YES	-	University of Singapore SG

'Query-by-example' allows the user to specify a query condition in an intuitive way, i.e., it is easy to express a query condition in a natural way. In QBE, a query condition for non-textual data is represented, for example, in the form of a motion example of trajectory and/or velocity. With references to implementation of content-based retrieval facility, there are several issues. In this process of extracting components that is associated with a content, raw data processing is inevitable. This processing is one of the most time consuming part in content-based retrieval. Improving the performance of raw data processing therefore improves the overall performance of the system.
"Query By Example Based Video Retrieval ", can thus be designed using primitive feature. The proposed scheme uses the Visual features for retrieval of relevant videos.

III. MATHEMATICAL MODELLING

- ***S={I,O,VD,C}*** Where, *S* is System having the parameters
  I-input, ***O***- Output, ***VD***- video database and ***C***.

- ***I=[Vf]={f1,f2,….fn}*** Where, ***I*** is input set, and
  Vf is number of frames in one video.

  - ***[Vf]={Vc,Vt}*** Where, ***[Vc]={r,g,b} , [Vt]={h,s,v}***

  Where *Vt* and *Vc* Is set of color and texture feature of frames respectively.

- ***O={Vi,……,Vn|i=1≤n,n ϵ N}*** Where, ***O*** is the output set.
  Vi…..Vn: number of videos.
  n : Number of videos in search results
  N : Number of videos in database

- ***VD={Vid,Vc,Vt,Vp[x]}*** Where ***VD*** is the video database.
  Vid = {1…….n}
  Vc = {c1j,c2j,……,cnj|j=1≤n}
  Vt={t1,t2,…….tn}
  Vp={p1x,……..pnx} Where ***Vp*** is video path

- ***P={δ_c,δ_t}*** Where ***P*** is processing
  δ_c and δ_t is the color and texture functions
  $\delta_c = [Ci]_i^j = X^t T(X) = \sum_{i=0}^{N} n_i \frac{max\, im}{N}$
  Where n_i is number of frames
  N is number of video images.
  δ_t : we adopted three indicators viz., hue, saturation, value

  Final Equation:

  Query video is ***Vq=s1,s2,……sq,sl*** and
  Database video is ***Vd={S , S ,…, S ,…}*** Where ,
  l is the number of frames in query video,
  m and ***v*** represent serial number of frame and video respectively.
  Based on observations, the database video which is similar to query *Vq* is defined as follows:
  SimV(Vq)= $\{V_i | I = arg \max_N \{\sum_N \sum_{j=1}^{m} \sum_{i=1}^{l} 1 Sim S(S_N^j)\}\}$ Where

SimS(s) denotes the frame which is similar to frame in query.

Performance measures :

Precision = $\frac{|correct|}{|retrieved|}$ × ***100%***

Recall = $\frac{|correct|}{|retrieved|}$× ***100%***

Where,

Correct is the number of relationally retrived videos

Retrieved is the number of all retrieved videos by the proposed approach.

C = {ci(1≤ i ≤ 180)and j=(1 ≤j≤8) , Videolength ≤ 10 sec, video format = AVI }

Where**, *Ci*** is the color feature and *tj* is the texture feature.

IV. IMPLEMENTATION OF SYSTEM

The system is applicable when user is having some videos with user and he/she wants the same or related more videos. The system will get the query video input; the feature of example video will be extracted on the basis of its color and texture features value. Texture features like Hue, Saturation, Value etc are extracted and Color Value (R,G,B) are extracted. The Database have key frames of videos in it, features of example video and the video that is in database are compared, when maximum features will get matched the result will return get back to user on percentile basis ranking. The user can download those videos also to his/her local machine.

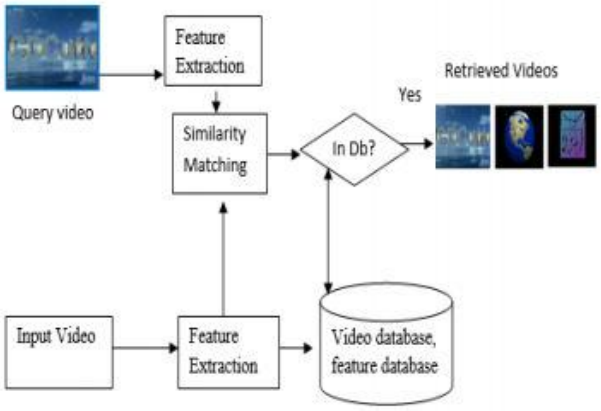

Figure 1. Video reteival System Architecture.

The system work as follows:

The system will get the query video input, the feature of example video will be extracted on the basis of it's color and texture features value. Texture features like Hue, Saturation, Value etc are extracted and Color Value from 0-255 is considered for feature extraction. On the same time Database also had some videos stored in it already, features of Database videos are also stored in database already, features of example video and the video that is in database are compared, when maximum features will get matched the result will return get back to user.

The Algorithm for Key frame Extraction and video upload in database works as follows, Admin does the uploading of video as follows :

i. Consider a .avi formatted video file as query input.
ii. Initially Set the Threshold value to 5.0
iii. Upload the video (Strictly check for .avi format)
iv. Convert video (.avi) into frames using Capture Function Provided in "Emgu.cv.dll", image library.
v. Save the Captured frames in .bmp format in database's temporary folder.

vi. After storing all frames of query video in database, Select key frames from them and deletes other frames.
vii. By using RGBColor Space Model, Compare Pixel by Pixel by using get pixel(pos1,pos2) function.
viii. If the RGB Values of pixel matches, then increment the counter. (Here the threshold value is set dynamically for (5 frames) some frames.)
ix. If the returned value is 0, then delete the frame in temporary folder, if 1 it is stored as key frame.
x. The key frames are stored in database and the video is uploaded on database

CONCLUSION AND FUTURE SCOPE

According to the surveyed content-based retrieval for multimedia database reference to multimedia database is done in a broad sense; this included retrieval of contents associated with a single type of non-textual data as a part of multimedia data retrieval. 'Query-by-example' allows the user to specify a query condition in an intuitive way, i.e., it is easy to express a query condition in a natural way. In QBE, a query condition for non-textual data is represented, for example, in the form of a motion example of trajectory and/or velocity. Such representations express the query condition for non-textual data better than keywords, since it is often difficult to express slight differences to shape, color, or spatiotemporal relation with keywords.

With references to implementation of content-based retrieval facility, there are several issues. In this process of extracting components that is associated with a content, raw data processing is inevitable. This processing is one of the most times consuming part in content based retrieval. Improving the performance of raw data processing therefore improves the overall performance of the system. These problems should be managed from three points of view, namely, performance, accuracy of results, and the user interface. Also, texture and color are important features for characterizing video sequences.

"Query By Example Based Video Retrieval ", can thus be designed using primitive feature. The proposed scheme uses the Visual features like color(R,G,B) and Texture(H,S,V) are going to be used for retrieval.

ACKNOWLEDGMENTS

Special thanks to the Prof. Mahesh Sanghavi, Prof. Kainjan Sanghavi, Prof Amol Shakadwipi for their valuable guidance and support and my family.

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