ISSN No. 0976-5697

Volume 7, No. 5, September-October 2016

International Journal of Advanced Research in Computer Science

CASE STUDY AND REPORT

Available Online at www.ijarcs.info

Content Based Video Mining: A Survey

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Abstract: The video data are increased over the world wide web. We want the efficient tool to extract the hidden useful information from these videos. Video Mining is the process of extracting the information from the large video. Content based video mining is an approach to searching and browsing of large video. In this paper, we present survey for content based video mining.

Keywords: Video Mining, Preprocessing, Segmentation, Feature Extraction, Content Based Video Retrieval

I. INTRODUCTION

Video data is becoming more popular in our daily life. The statistical report of the YouTube official website says that, more than 1 billion unique users visit YouTube each month, Over 6 billion hours of video are watched each month on YouTube, 100 hours of video are uploaded to YouTube every minute. Facing the rapid growth of volumes of web videos, sometimes it becomes extremely difficult for users to find the right information [2].

Video mining involves three main tasks: preprocessing, features and semantic extracting, video patterns and knowledge discovering and representing [1]. Extract or mining using content of the video is referred to as content based video mining. Here the term content is referred to color, shape, frame, size, and pixel of the video.

II. PRESENT THEORY AND PRACTICES

Huang-Chia Shih, Chung-Lin Huang et al. proposed "Video Attention Ranking using Visual and Contextual Attention Model for Content-based Sports Videos Mining". In this paper, they propose new video attention modeling and content-driven mining strategies which enable client users to browse the video according to their preference. By integrating the object-based visual attention model (VAM) with the contextual attention model (CAM), the proposed scheme not only can more reliably take advantage of the human perceptual characteristics but also effectively discriminate which video contents may attract users' attention. In addition, extended from the Google PageRank algorithm which sorts the websites based on the importance, they introduce the so-call content-based attention rank (AR) to effectively measure the user interest (UI) level of each video frame. The information of users' feedback is treated as the enhanced query data to further improve the retrieving accuracy [3].

Ja-Hwung Su et al. proposed "Efficient Content-based Video Retrieval by Mining Temporal Patterns". In this paper, they propose an innovative method for achieving effective content-based video retrieval by mining the temporal patterns in the video contents. Based on the temporal patterns, an efficient indexing technique is proposed to reduce the computation cost in searching videos. To achieve this proposed method through stages. 1) Preprocessing Stage: this stage mainly involves the processing of videos, which includes shot detection, feature extraction, shot clustering and shot encoding. This is a foundational stage for indexing the videos in the database and processing the query clip. Finally, whether for the query clip or the videos in the database, each of them is assigned a symbol by its belonging cluster number.2) Indexing Stage: The goal of this stage is to build an index tree, called FPI (fast-pattern-index tree)-tree, by the symbolized patterns of the videos in the database. 3) Search Stage: Search the most similar videos to the query clip is the primary task in this stage. Finally they also provide some future work [4].

S.Padmakala et al. proposed "An Effective Content Based Video Retrieval Utilizing Texture, Color and Optimal Key Frame Features". In this paper, with the intention of retrieving video for a given query, the raw video data is represented by two different representation schemes, video segment representation (VSR) and Optimal key frame representation (OFR) based on the visual contents. At first, the input raw video is segmented using video object segmentation algorithm so that the objects presented in this raw video can be obtained. Then, feature vectors are computed from VSR using the texture analysis and color moments. Furthermore, the optical frame (OFR) is extracted by considering the probability of occurrence of the pixel intensity values with respect to the pixel location among every frame presented in a raw video. Finally, all these features of a video, texture, color and optical frame are combined as a feature set and stored in the feature library. For the query video clip, the aforesaid features are extracted and compared with the feature in the feature library. The comparison is achieved via the feature weighted distance measure and the similar videos are retrieved from the collection of videos [5].

B. V. Patel et al. proposed "Content Based Video Retrieval". Proposed approach consists of various modules for key frame extraction, indexing, features extraction, similarity search etc. They use a dynamic programming approach to compute the similarity between the feature vectors for the query and feature vectors in the feature database. Proposed Video Storage and Retrieval System, stores and manages a large number of video data and allows users to retrieve videos from the database efficiently. It is interactive web based application which takes video frame from users and retrieve the information from the database. Database consists of various video data like still

video frames, audio and video. The retrieval is based on the content of the video object. Proposed System provides different functionality for two main clients-which are Administrator and user. Administrator is responsible for controlling the entire database including security and adding, updating and deleting videos to and from database. User can only retrieve videos based on submitted query based on content as well on metadata. Finally some future works have been recommended at the end of this paper [6].

Thanh DUC NGO et al. proposed "Scalable Approaches for Content Based Video Retrieval". In general, a video itself contains multiple types of information including embedded video metadata, audio content, and visual content. In this paper, they address video retrieval systems based on information derived from visual content only. First, they address video retrieval based on human face. They presented robust and efficient approaches for face-track extraction and face-track matching. Second, they target video retrieval based on object categories appearing in videos. The main goal of this paper is to develop approaches which require lowest annotation cost or computational cost while achieving competitive accuracy. They introduce approach based on Multiple Instance Learning. Spatial information is taken into account to achieve significant accuracy improvement [7].

Madhav Gitte et al. proposed "Content Based Video Retrieval System". In this paper they present a System that supports video mining from multimedia warehouse using multimodal feature has two stages, the first one is building the multimedia warehouse and the second one is retrieving the video from that multimedia warehouse. Content Based Video Retrieval (CBVR) System it includes various steps: Segments the video into shots, Selects the key frame to represent the shot using Euclidian Distance Algorithm, 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. Hierarchical Clustering Tree Algorithm is used to index the key frames. For retrieving the video from warehouse, the retrieval subsystem processes the presented query, performs similarity matching operations and this can be done using Euclidian Distance Algorithm, and finally displays the result to end user [8].

N. Sudha Bhuvaneswari et al. proposed "Content based Video Querying Technique for Video Retrieval and Video Making from Large Video Compilation". This proposes is an innovative algorithm for automated video object analysis and ranking. They introduces a novel content-based video matching and copy elimination system that finds the most relevant video segments from video database based on the given query video clip. For effective video copy elimination based on the feature extraction the proposed system applies the scheme names as Dense SIFT_OP (DSIFT_OP). This performs the feature extraction, copy elimination and effective query matching from the video collections. The proposed approach robustly identifies the duplicate frames and aligns the extracted frames, which containing the significant spatial and temporal differences. At the end of this paper they recommended some extension of this process [9].

D.Saravanan et al. proposed "Video Content Retrieval Using Histogram Clustering Technique". In this paper focus the fast retrieval of video data by using histogram clustering. Clustering is a best technique to discover some information from dataset. In the beginning of the proposed process, the video is first converted into sequence of frames. Afterwards the video clustering algorithm is employed where two searching process are there. The first searching process is on the image matrix and it is utilized to identify the centroids in order to remove the duplicate frames in the video. Next the second search is on the image pixel and it is mostly used to create the cluster. A novel matrix based indexing technique at first converts the video into number of frames. Then the input frame is splitted into columns and rows. Afterwards matrix cell histogram is calculated and it is used to retrieve the video or else the query image from the video database. The proposed frame work will provide the better results when compared to the existing techniques. They also give some future work at end of this paper [10].

Ms.Deepti Bhatia et al. proposed "Edge Detection for Moving Object Tracking". This paper evaluates Video Classification based on Discrete Cosine Transform for Classification of Sports and Cartoon Videos. The process of classifying videos based on their content merges two prominent research areas, viz., Data Mining and Image Processing. Feature extraction techniques used in Image processing for the sake of image compression describe an image using an array of values. These techniques can be used to identify and represent the key frames involved in the creation of a video. One of the popular feature extraction techniques "Discrete Cosine Transform" is used in the paper to represent video key frames. Since DCT works on a block by block basis, this paper evaluates the accuracy of classification by dividing the image into 64 and 256 equal sized blocks. The preprocessed and selected features are then provided to the classifier. This paper evaluates the classification accuracy with three classifiers, viz., Naive Bayesian, k-Nearest Neighbor and OneR. This paper evaluates Video Classification based on Discrete Cosine Transform for Classification of Sports and Cartoon Videos [11].

Mr. Siddhant Kulkarni et al. proposed "A Novel Model for Content Based Video Classification of Distributed Datasets". The paper describes proposed model along with the implementation details. It presents three steps in which the proposed model for distributed data was developed: Simple standalone, multi-threaded standalone and finally the model for distributed data sets. This paper presents a novel model for Distributed Multithreaded Video Classification. This model classifies video data distributed over a set of nodes with optimum resource utilization. The model uses number of threads equal to the available number of processors in order to utilize the full processing power supported by the latest processors. In addition to this, the number of slave nodes contributing to DMVCM can be increased and decreased as per availability. The method of implementation as well as the platform independence of Java allows heterogeneous systems to participate in the model [12].

III. OBSERVATION TABLE OF DIFFERENT VIDEO MINING FUNCTIONS

Sr. No	Authors	Year	Proposed Method	Data Input	Parameters used for evaluation	Results

1	Huang-Chia Shih	2007	Proposed Video Attention Ranking using Visual and Contextual Attention Model for Content-based Sports Videos Mining.	Commercial baseball game sequences.	1) Visual Attention Model (VAM) 2) Contextual Attention Model (CAM) 3) Attention Rank (AR)	The proposed method produces promising results.
2	Ja-Hwung Su	2009	Proposed an innovative method for achieving effective content-based video retrieval.	Collection of 15 video categories in real life.	1) DFPI-tree 2)SFPI-tree 3)BSW 4)ASW	The proposed method produces excellent performance for content-based video retrieval in terms of efficiency and effectiveness.
3	S.Padmakala	2011	Developed an efficient content based video retrieval system.	50 videos obtained from open direct video project.	1) Video Segment Representation (VSR) 2) Optimal Key Frame Representation (OFR)	The proposed system achieved very promising and effective performance in video retrieval.
4	B. V. Patel	2012	Video analysis is conducted on low level visual properties extracted from video frame.	E-learning, sports, cartoon, movies.	1) Gray Level Co-occurrence Matrix1 (GLCM 2)Simple Color Histogram 3)Simple Region Growing 4)Auto Color Correlogram 5) Naive Vector	Experimental results show that integration of extracted features improves video indexing and retrieval.
5	Thanh DUC NGO	2014	Proposed method for content based video retrieval.	8 Video sequences from different video broadcasting stations.	1)Support Vector Machine 2)MA 3)GSC	The proposed methods are robust and efficient.
6	Madhav Gitte	2011	Presenting Content Based Video Retrieval (CBVR) System.	Video sequences	1) Euclidian Distance Algorithm 2)RGB, Local Color Histogram (LCH) and Global Color Histogram (GCH) 3) Support Vector Machine	Proposed method to increase the performance of the system.
7	N. Sudha Bhuvaneswari	2014	Extracting and storing video clips for content-based video query.	Traffic related videos.	1)Sift Invariant Feature Transform (SIFT) 2)RGB	Proposed method improves the accuracy and performance.
8	D.Saravanan	2015	New approach for fast retrieval of video data by using histogram clustering.	Video files	1)Histogram clustering 2)CHEMELEON graph	The proposed method works efficiently.
9	Ms.Deepti Bhatia	2015	Video Classification based on Discrete Cosine Transform for Classification.	Sports and Cartoon Videos.	1)Discrete Cosine Transform 2) Naive Bayesian 3) OneR 4) K-Nearest Neighbor	Experimental results show accuracy of video classification.

10	Mr. Siddhant Kulkarni	2015	Novel model for Distributed Multithreaded Video Classification.	Video files	1) Simple Standalone Video Classification Model (SSVCM) 2) Multithreaded Video Classification Model (MVCM) 3) Distributed Multithreaded Video Classification Model (DMVCM)	The proposed method works efficiently.

IV. CONCLUSION

Video mining refers to extract hidden information from the large video. The main purpose of this paper is used to give survey for content based video mining. The first section gives the introduction, section two gives the reviews, and section three gives the observation table.

V. REFERENCES

[1] KexueDai, JunZhang, Guohui Li, "VIDEO MINING: CONCEPTS, APPROACHES AND APPLICATIONS," 1-4244-0028-7/06 ©2006 IEEE.

[2] Siddu P. Algur, Prashant Bhat, Suraj Jain, "A NEW APPROACH FOR VIDEO OBJECT MINING: ISSUES AND CHALLENGES," International Journal of Engineering Sciences & Research Technology, ISSN: 2277-9655.

[3] Huang-Chia Shih, Chung-Lin Huang, Jenq-Neng Hwang, "VIDEO ATTENTION RANKING USING VISUAL AND CONTEXTUAL ATTENTION MODEL FOR CONTENT-BASED SPORTS VIDEOS MINING," 1-4244-1274-9/07 ©2007 IEEE.

[4] Ja-Hwung Su,Yu-Ting Huang,Vincent S. Tseng, "EFFICIENT CONTENT-BASED VIDEO RETRIEVAL BY MINING TEMPORAL PATTERNS," MDM/KDD'08, August 24, 2009, Las Vegas, NV, USA.

[5] S.Padmakala, Dr.G.S.AnandhaMala, M.Shalini, "AN EFFECTIVE CONTENT BASED VIDEO RETRIEVAL UTILIZING TEXTURE, COLOR AND OPTIMAL KEY FRAME FEATURES," 978-1-61284-861-7/11 ©2011 IEEE.

[6] B. V. Patel , B. B. Meshram, "CONTENT BASED VIDEO RETRIEVAL," The International Journal of Multimedia & Its Applications (IJMA) Vol.4, No.5, October 2012.

[7] Thanh DUC NGO, DUY DINH,Shin'ichi SATOH "SCALABLE APPROACHES FOR CONTENT BASED VIDEO RETRIEVAL," DOI:10.2201/Niipi.2014.11.5.

[8] Madhav Gitte, Harshal Bawaskar, Sourabh Sethi, Ajinkya Shinde "CONTENT BASED VIDEO RETRIEVAL SYSTEM," International Journal of Research in Engineering and Technology ,Volume: 03 Issue: 06 | Jun-2014.

[9] N.Sudha Bhuvaneswari Ph.D, M.Madhanika,"CONTENT BASED VIDEO QUERYING TECHNIQUE FOR VIDEO RETRIEVAL AND VIDEO MAKING FROM LARGE VIDEO COMPILATION," International Journal of Computer Applications (0975 – 8887) Volume 106 – No.6, November 2014.

[10] D.Saravanan , Vaithya subramanian , K.N. Jothi Vengatesh, "VIDEO CONTENT RETERIVAL USING HISTORGRAM CLUSTERING TECHNIQUE,"Procedia Computer Science 50 (2015) 560 – 565.

[11] Ms. Deepti Bhatia, Ms. Sonali Sabale, Mr. Siddhant Kulkarni, Ms. Sandhya Shinde "A THOROUGH EVALUATION OF DISCRETE COSINE TRANSFORM FOR CONTENT BASED VIDEO CLASSIFICATION," 978-1-4799-6892-3/15 © 2015 IEEE.

[12] Mr. Siddhant Kulkarni, Ms. Deepti Bhatia, Ms. Sonali Sabale, Ms. Sandhya Shinde, "A NOVEL MODEL FOR CONTENT BASED VIDEO CLASSIFICATION OF DISTRIBUTED DATASETS," 978-1-4799-7165-7/15©2015 IEEE.

[13] Dr. M. Mohamed Sathik, Ms. M. Parveen, "AN EFFICIENT METHOD TO FIND VIDEO OBJECTS," International Journal of Advanced Research in Computer Science, Volume 1, No. 1, July-August 2010, ISSN No. 0976-5697.

[14] Dr. M. Mohamed Sathik, Ms. M. Parveen, "EXTRACTION OF OBJECT FROM THE VIDEO," International Journal of Advanced Research in Computer Science, Volume 1, No. 3, Sept-Oct 2010, ISSN No. 0976-5697.

[15] P.Peer Fatima, M.Parveen, Dr. M. Mohamed Sathik, "An Efficient Method of Video Mining to Recognize the Speech of the Video Objects," ciit- international Journal of Data Mining and
Knowledge Engineering, Vol: 3, No: 1, January2011.

[16] M.Parveen, M.Mohamed Sathik, N.Ravia Shabnam Parveen, "A METHOD TO MINE THE FEELINGS AND GESTURES OF THE OBJECT FROM THE VIDEO," European Journal of Scientific Research ISSN 1450-216X / 1450-202X Vol. 110 No 4 August, 2013, pp.579 – 585.