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Content Based Video Mining

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***Abstract*:** Video Mining is the process of extracting the data from the large video. Content based video mining is an approach to searching and browsing of large video. Here content refers to size, color, pixel, shape. In this paper, we propose an innovative method for achieving effective content based video mining. The proposed method includes steps: pre-processing, segmentation, feature extraction, clustering, and video retrieval.

Keywords: Pre-Processing, Segmentation, Feature Extraction, Clustering, Video retrieval, Data Mining

I. INTRODUCTION

Data Mining refers to 'mining' or 'extract' information from the large database. Multimedia mining is one of the subfield of data mining. Video mining is an approach to extract information from large video. Video mining is one of the types of multimedia mining. Video is represented in the form of shots. Video content mining refers to mining video based on content. Here the content refers to frame, size, pixel, color, shape. In this paper we propose new technique to mining video content.

In recent years, multimedia content processing has become a hot topic with the rapid development of information technology and popularity of World Wide Web. Advanced digital capturing technology makes digital data grow rapidly. Through the ease of communication tools, millions of multimedia data are exchanged in the world at any time. Hence, knowledge discovery from massive amounts of multimedia data, so-called multimedia mining, has been the focus of attention over the past few years. [4].

The proposed method includes the steps: Data input: Get input from the World Wide Web or other sources. Pre-processing: Real world data are generally incomplete, lacking attribute values, containing errors so we do data pre-processing. Data cleaning, integration, transformation, reduction, discretization process are done in this stage [9]. Segmentation: The videos are segmented into the key frames. The videos are segmented at different size, frames and key length. Feature extraction: Features are extracted based on size, shape, and color from the video. Feature key frames are extracted and stored in the feature vector. Clustering: The extracted features are clustered using K-Means algorithm. Video Retrieval: User gives the query by image and gets the related video.

II. REVIEW ON VIDEO CONTENT MINING

Video mining is unsubstantiated to find the interesting patterns from large amount of video data; multimedia data is video data such as text, image, and metadata, visual and audio. The processing are indexing, automatic segmentation, content-based retrieval, classification and detecting triggers. It is commonly used in various applications like security and surveillance, entertainment, medicine, sports and education programs [2]. Content based on the content is referring to video content mining. "Content-based" means that the search will analyze the actual content of the video. The term 'Content' in this context might refer colors, shapes, textures [3]. In this we represent the review of video content mining.

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. The proposed achieve through the three stages 1) Preprocessing stage: this stage mainly involves the processing of videos, which includes shot detection, feature extraction, shot clustering and shot encoding. 2) Indexing stage: The goal of this stage is to build an index tree, called FPI (fast-pattern- index) -tree, by the symbolized patterns of the videos in the database. 3) Search stage: Once FPI-tree is ready, how to take advantage of the index tree to search the most similar videos to the query clip is the primary task in this stage. The main contribution of the proposed method is to achieve the high quality of video retrieval without considering the query terms. The utilization of the pattern-based index can effectively deal with the problems of high dimensions of visual features, which occur in visual-based sequence matching methods [4].

Weiming Hu, et al. Proposed "A Survey on Visual Content-Based Video Indexing and Retrieval". They have presented a review on recent developments in visual content-based video indexing and retrieval. The state of the art of existing approaches in each major issue has been de- scribed with the focus on the following tasks: video structure analysis including shot boundary detection, key frame extraction and scene segmentation, extraction of features of static key frames, objects and motions, video data mining, video classification and annotation, video search including interface, similarity

measure and relevance feedback, and video summarization and browsing. At the end of this survey, they have discussed future directions such as affective computing-based video retrieval and distributed network video retrieval [5].

N. Sudha Bhuvaneswari et al. Proposed "Content based Video Querying Technique for Video Retrieval and Video Making from Large Video Compilation". This proposal, 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. This thesis overcomes the problem of video frame mining based on effective Meta information's and semantic similarity measures. The proposed approach robustly identifies the duplicate frames and aligns the extracted frames, which containing the significant spatial and temporal differences [6].

Abinaya Sambath Kumar et al. Proposed "A Survey on Multimodal Techniques in Visual Content- Based Video Retrieval". This paper proposed an overview of the different existing techniques in multimodal content based video retrieval and different approaches to search in the long videos. The framework consists of following steps.1) Video Segmentation which includes shot boundary detection 2) Feature Extraction includes extracting feature from segmented video clips. 3) Video mining to the output of extracted feature. 4) Video annotation to build a semantic index. 5) User query. 6) Feedback and Reranking returns the video to user and feature retrieval are optimized using feedback. They also discussed future research problems [7].

D.Saravanan et al. Proposed "Video Content Retrieval Using Historgram Clustering Technique". This paper focuses the fast retrieval of video data by using histogram clustering. In the beginning of the 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. This type of pixel searching takes the smaller amount of time to cluster. Hence it automatically overcomes the issues of time complexity. 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 [8].

III. PROPOSED APPROACH AND FRAME WORK

In this section the new frame work for the video content mining described. The diagrammatic representation of new frame represented in the figure 1.

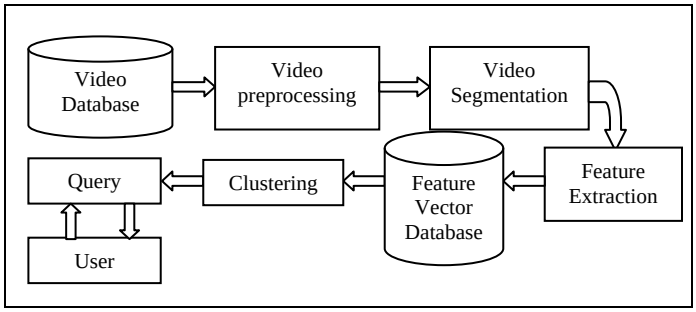

Figure 1: Proposed Video Content Mining Framework

A. Video database

Video data base contain input video which videos are mining based on content. The input videos can be downloaded from web and also can be get videos from other database repositories.

B. Video preprocessing

Data in the real world is dirty, incomplete: lacking attribute values, lacking certain attributes of interest, or containing only aggregate data, noisy: containing errors or outliers, inconsistent: containing discrepancies in codes or names, Quality decisions must be based on quality data. So we preprocess the data. Data cleaning, Data integration and transformation, Data reduction, Discretization and concept hierarchy generation processes are done in this stage [9].

C. Video segmentation

Video is the collection of continuous frames, displayed at some specific rate (normally 25 fps) [11]. In this stage the videos are segmented into key/frame using the Watershed algorithm. Watershed based image segmentation algorithms are less computational complex and provide very good segmentation results. It is possible to implement in the hardware using pipelined and/or parallel architecture for real time applications because of the independent mathematical computations flow of the algorithms [13].

D. Feature extraction

Videos are segmented successfully next features are extracted using the technique SIFT. Scale Invariant Feature Transform (SIFT) is an image descriptor for image-based matching and recognition developed by David Lowe (1999, 2004). This descriptors as well as related image descriptors are used for a large number of purposes in computer vision related to point matching between different views of a 3-D scene and view-based object recognition. The SIFT descriptor is invariant to translations, rotations and scaling transformations in the image domain and robust to moderate perspective transformations and illumination variations [12]. Extracted features are stored in feature vector.

E. Clustering

Clustering is a best technique to discover some information from dataset. This technique maps data item with one cluster, the clusters for data items are normal groupings and this group are mainly as per the probability density model or similarity metrics model. Clustering is said to be an unsupervised learning procedure, and it aims at identifying the structure in a group of unlabeled data to solve problems of this kind. Clustering is a process of dividing data into clusters of similar objects [8]. Widely used K-Means algorithm is used for clustering process.

F. Video retrieval

The indexing process is done then the video retrieval process start. This is the final step of the proposed method. In this stage the user give the query by image, this image compared with the already clustered data then the user get resulting video.

IV. EXPERIMENTATION AND RESULTS

This section discusses the experiments of the thesis. Experiments are performed on Intel Core (R) Pentium (R) CPU N3530 @2.16 GHz with 4.00 GB RAM. Windows 8.1-64 bit Ultimate Edition Operating System was used with complete Administrative rights. All the experiments have been performed with the system in High Performance mode to achieve maximum throughput from the system. The input videos are downloaded from web and from other offline resources.

The following table shows the experimentation results of the proposed method. Table 1 contains the query image given by the user and result of the related video output.

Query by Image	Results
 OGGY	 OGGY v1
 Tarzon	 Tarzon v2
 Kid vs Cat	 Kid vs Cat v3
 Timon & Pumpa	 Timon & Pumpa v4
 Tom & Jerry	 Tom & Jerry v5

V. CONCLUSION AND FUTURE WORK

The main aim of this paper is used to give new approach to content based video mining and also represent the review of the work. User gets the input videos from different resources, the videos are segmented it refers videos converted into shots, frames, and the key frames these frames are stored in database then the features are extracted, features are two types spatial and temporal. Extracted features are stored in feature vector database. User give query by image the relevant video extracted. Many issues are in further research in content based video mining especially the following: Domain knowledge of the user is avoided further, directly mining the video directly from web.

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