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Review on Video Mining

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ABSTRACT
In the earliest time with the growth of digital libraries and video databases, it is becoming very important to understand and mine the knowledge and information from video database automatically. Many video mining approaches has been proposed till now for extracting useful knowledge from video database. To find the intended information in a video clip or in a video database is still a difficult and laborious task due to its semantic gap between the low-level characteristics and high-level video meaning concepts. We have done survey on previous paper that are representing the various data mining applications, functionalities, and video features.

Keywords:- Data mining; Video mining; Feature extraction

I. DATA MINING

Data mining is the method of data analysis from the different collection of databases and summarizing it into some useful information. Data mining software is use of many analytical tools for analyzing data present in the database. It is allowing users to analyze data from many different directions or angles, dimensions categorize it, and summarize the relationships identified between them. Technically, data mining is the method of finding correlations between information and patterns among dozens of fields in relational databases. [10]. Data warehousing is defined as a system of centralized data management and retrieval of information. Data warehousing is representing an ideal vision of maintenance of repository of all data. Centralization of data is required to hike user access and analysis. Data mining has five major elements: Extracting information, transform it. And load transaction data into the data warehouse system. Data mining Functionalities include:-

a) Its Characterization and discrimination from others: - data characterization is a collection and merge of data of the Class under study and data discrimination is the process for comparison of the target or desired class with one or a set of other Comparative classes. Class/concept descriptions are derived using these two functionalities.

b) The mining of frequent patterns, associations and correlations: - consistent or frequent patterns are the patterns that occur frequently i.e. one after the other in data. Association rule mining is the process of finding interesting correlations, frequent patterns or associations between different collection of items in the transactional databases, relational databases or other information repositories.

c) Classification and regression: - classification is a machine learning technique used for predicting group membership for data examples taken by them. Regression analysis is a methodology that is mainly used for numeric prediction.

d) Cluster analysis: - Cluster analysis or clustering is defined as the method of group of a set of objects in the way that objects present in the same group called as a cluster. cluster are more similar in some sense or

another to one another than to those in other groups

e) Outlier analysis: - some objects in a data set are not complying with the general behavior or model of the data from database. These data objects are outliers and analysis of outlier data is known as oilier analysis

II. VIDEO MINING

Video mining is the process of extracting the data from the videos. Video is represented in the form of shots. Video Mining consists of three major functions, such as video analysis, object detection and tracking, and video Editing.

- Video analysis extracts specific scene such as highlight scene of sports program, scene of mountains, sea, indoor, outdoor, etc., and detects specific event such as pause, gesture, walking, running, laughing, surprising, etc.
- Object detection and tracking, for example searches for a specific person and keep tracking the person. Its search targets are not limited to a human, but also it may include specific animals such as dogs, cats, houses, cows, mice, etc., mobile object such as cars, tracks, bikes, trains, aircrafts, boats, vessels, ships, etc., and structures such as buildings, houses, bridges, tunnels, etc.
- Video editing outputs video stream with indicating the mining results by the above functions.

Multimedia data are acquired at a higher rate due to technological advancement in sensors, computation power, and memory. [10]. Multimedia Data Mining is the method of extraction of previously unknown knowledge or information and detection of interesting patterns from a huge collection of multimedia data.

Video has become one of the very famous multimedia due to its highly useful information and entertainment capability. It also consists of audios, videos and texts together.

Video mining is a method which is not able to do extraction automatically of the content and structure of videos, feature of moving object, spatial or temporal correlations among those features, but has also discovered patterns of video structure, objects activity, video events, etc. from wide amounts of video data without little assumption concerned with their contents. Many video mining techniques have been proposed for extraction of useful knowledge from video databases. Finding of accurate and required information in a video clips or in a video databases are still a cumbersome and laborious task because of its semantic gap between the low-level feature and high-level video semantic or meaning concept. Video data mining could be classified in following categories, such as pattern detecting, and video association mining one of the main problems in video data mining process. Mining association rule from video data are straightforward extended of association rule mining in transaction databases. It is the technique of discovering associations in a given video. It aims to extract interesting correlations, frequent patterns, associations or casual structures among different sets of items in the video databases. So this technique is an extension of data mining to image domain. It is an interdisciplinary field that combines techniques like computer visions, digital image processing, data mining's, machine learning's, data bases and artificial intelligence.

The major steps involved in the video association rule mining system are: pre-

processing, feature extraction, database construction and Video data construction.

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Task	Approaches / Applications	Issues
Data preprocessing	Shot level, Frame level, Region (object) level, scene level	Depends on video data model and application domain
Feature extraction	Text feature, motion feature, region level	Visual features and audio features are sensitive to the parameters Motion calculation.
Video data construction.	Apriori based finding sequence of events	Finding semantic boundaries; Scalability, efficient data is used.

Table 1. Issues of Video Association Mining

- **Video Pre-processing**

Generally, video data are unstructured data source. So, the knowledge cannot be extracted directly. To convert in a structured format the video data is parsed into video shots. Discovering the shot boundary is the first of the pre-processing phase. A video shot can be considered as basic unit of video data.

- **Feature Extraction**

Image processing algorithms are used to extract visual features from the key frame images. Audio signal classification systems are employed the extraction of a set of audio features from the input audio signal. Pitch, Tumbrel features (Zero crossings, Mel frequency cepstral coefficients).

- **Video Data Construction**

Generally, each and every symbolic stream (visual, audio, text and objects with frame window) is assigned a symbol for constructing the video sequence. Each key frame in the video is treated as time unit and transform the extracted features of each time unit into symbolic streams according to the Look-up Table (consists the equivalent symbol for every feature) mapping. Finally, the original video data is transformed into temporal video sequence which consists of multiple streams into single stream. The transformed structured video sequence is used to mine the association in video database.

- **Video mining system**

Video Mining system receives video stream(s) such as camera input, H.264, etc. as shown in Fig.1. The object detection is similar to the image recognition. In general recognition process is based on a frame, but video mining process is based upon shots that consist of multiple frames. Video mining system detects the short boundary and feature extraction such as human, structure, mobile. And generate the output in the form of output video stream.

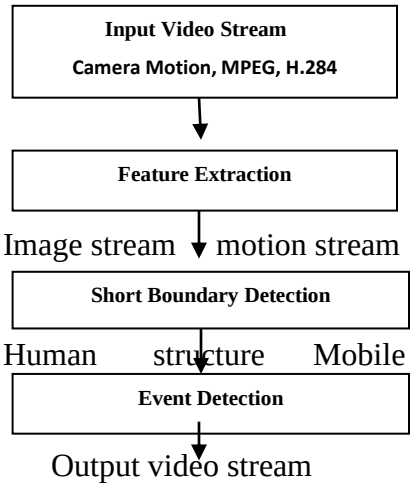

Fig 1:- Video Mining System

Parallelism inherent in Video Mining:-

There are two levels are used high level and low level. In high level multiple input video streams are separated into image streams, motion streams in frames, audio streams, etc. and in low level each process of Video analysis, Object detection and tracking, and video editing.

Application	Objective	Algorithm
Video analysis	➢ Detect specific feature ➢ Detect and track human ➢ Detect line for separation	SIFT Cascaded Haar- like Hough transform
Human detection	➢ Detect face from various direction ➢ Extract feature of phase	Vector face detection Model based phase detection
Video editing	➢ Extract segment ➢ Detect motion vector	Graph-based segment Block matching

Table [2]. Algorithms inherent for Video Mining

III. RELATED WORK

Yukoh et al. [1] Manycore Processor for Video Mining Applications designed a scalable processor collection of clustered heterogeneous cores with stream processing capabilities This Algorithm design for Video Mining Applications, and null-overhead process communication through FIFO with a hardware and software mechanism. To achieving performance and null-power consumption, especially reduce memory access required for Video Mining Applications, each application is partitioned to exploit data parallelism, and well programmed as a distributed stream processing with Kahn Process Network model.

Xiaoqing et al. [2] Low-complexity reinforcement learning for delay-sensitive reduction in networked video stream mining formalizes the decision at the encoder side as an infinite horizon Markov Decision Process (MDP). We employ low complexity, model-free reinforcement learning schemes to solve this problem efficiently under dynamic and unknown environment. Our proposed scheme adopts the technique of virtual experience (VE) update to drastically speed up convergence over conventional Qlearning, allowing the

encoder to react to abrupt network change son the order of minutes, instead of hours.

Jayalatchumy et al. [3] Web Mining Research Issues and Future Directions reports the detail of various techniques of web mining approached angles are Feature Extraction, and Transformation. The research work complete by different users depicting the pros and cons are explained. The internet acts as popular way to exchange information. Due to the large information on the web, the users cannot use the information very effectively and easily.

Vijayakumar et al. [4] Mining Video Association Rules is based on Weighted Temporal Concepts is able to discover significant inter relationships in video order using weighted temporal concepts. The weight of the video sets has taken the quality of transaction into consideration by using changed link-based models. The mined association rule has some practical significance. This strategy is identifying the valuable rule compared to Apriori based video sequences algorithm. They also put results of applying these algorithms to a synthetic data set, which show the successfulness of our algorithm.

Vijayakumar et al. [5] recent trend and research issues in video association mining is providing a general framework of mining process the association rules from video database. It is able to represent the research issues in video association mining following by the recent trends. With the growing digital library and video database, it is increasingly getting make out to understand and mine the knowledge from video database automatically. Based on the past development, application of association rule mining is rising in different domains such as broadcast news, sports, movies, medical information, as well as personal and online media collections.

Vijayakumar et al. [6] Mining Best-N Frequent Patterns in video Sequence has shown that a new mining task known as mining Best-N frequent pattern, i.e. N is the largest rank values of all frequent patterns which are to be mined. An efficient algorithm named as Modified VidAprioriis used to mining Best-N frequent patterns. It is having two key phases are (I) Videos pre-processing and (ii) the Frequent Temporal Patterns Mining. The first and foremost phase transforms the original input video to a sequence or desired format. The second phase is concerned with the production of frequent pattern.

Geetanjali et al. [7] Video Data Mining: Event detecting among the Association Perspective by using FP-growth Tree replace Apriori with change (to work on streamed data) Frequent Pattern-growth tree algorithm. Advances in computing, communication, and data storage have led to an increasing number of large libraries available on the Internet.

Xingquan et al. [8] Video Data Mining: Semantic Indexing and Event Detection from the Association Perspective present a based on video indexing they provided a sufficient method to explore video knowledge by using mining associations from video database. The definitions and evaluation measures (e.g., temporal support and confidence) for video associations are shown by together the feature of video data.

Emily et al. [9] Automatic video annotation through search and mining is employing a two-step method of finding out followed by mining. From a given a query video that is consisting of visual content and speech-recognized transcripts, same video is first

ranked in a multimodal search. Then, the transcripts associated with these similar video is mined for extracting keywords for the query. [9]

IV. CONCLUSION

With the growing need of digital libraries and video databases, it is really very necessary to understand and mine the knowledge from video database automatically by the system. There are many different approaches that have been proposed till now for extracting useful knowledge from video database. One should emphasize on the making of database that could be able to get the desired information by using its features. There are different approaches in which there is still need to work upon it, as it is very cumbersome work due to its semantic gap between the low level and higher level video concepts. We have reviewed different data mining functionalities and its features.

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