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Video Image Retrieval Using Data Mining Techniques

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Abstract - **Data mining technique can be applied in various documents. In this paper concentration on the application of video data, called video data mining, because acquisition and storage of video data is an easy task but retrieval of information from video data is challenging task. So video data mining plays an important role in efficient video data management for information retrieval. This paper describes a proposed framework for video data mining to extract the information from video data. This includes developing the technique for shot detection then key frame analysis is considered to compare the frames of each shot to each others to define the relationship between shots. After all hierarchical clustering technique is adopted to make a group of similar shots to detect the particular event on some requirement as per user demand.**

***Index Terms* – Video data mining, key frame analysis, clustering technique.**

I. INTRODUCTION

A wide range of possible applications that require data mining of video databases includes: news broadcasting, military, video, education and training, cultural heritage, advertising, web searching, crime prevention, geographical information system (GIS) etc. these applications has vast collection of images in the corresponding video databases and can be mined to discover new and valuable knowledge. Data mining of video databases aims to automate such a knowledge discovery process. To help user finds and retrieves relevant video effectively and to facilitate new and better ways of entertainment, advanced technologies must be developed for searching and mining the vast amount of videos now available on the web. Although valuable information may be hiding behind the data.

The problem of video data mining combines the area of content-based retrieval, image understanding, data mining, video representation and databases [4] [5] [6].

Many applications maintain temporal and spatial features in their databases; these features cannot be treated as any other attributes and need spatial attention.

To be more particular instead of simply asking ourselves 'what' knowledge, it plays an important role and these can be trivially handled instead of simply asking ourselves 'what' knowledge, it plays an important role and these can be trivially handled by spatial and temporal role and these can be trivially handled by spatial and temporal data mining techniques [7]. Finally data mining of video databases is essentially a task of learning from video data can, in principle, being applied for data mining purposes. In general data mining algorithms aim at minimizing I/O operations of disk resident data, whereas conventional algorithms are more concerned about time and space complexities, accuracy and convergence. Simply stated, the objective of video data mining is the organizing of video data for knowledge exploring or mining. Where the knowledge can be explained as special patterns (e.g., events, clusters, classification, etc.), which may be unknown before the processing. Many successful data mining techniques have been developed through academic research and industry hence, an intuitive solution for video data mining is to use these strategies on video data.

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II. VIDEO DATA MINING

Here we define video data mining as finding correlations and patterns previously unknown, the current status of video data mining remains mainly at the pre-processing stage, in which the preliminary issues such as video clustering, and video classification are being examined and studied for the actual mining.

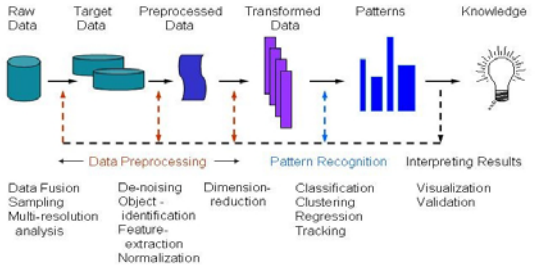

Figure 1. Data mining Interactive Process system.

The most commonly used techniques in data mining are:

Artificial neural networks: Non-linear predictive models that learn through training and resemble biological neural networks in structure.

Decision trees: Tree-shaped structures that represent sets of decisions. These decisions generate rules for the classification of a dataset. Specific decision tree methods include Classification and Regression Trees (CART) and Chi Square Automatic Interaction Detection (CHAID) .

Genetic algorithms: Optimization techniques that use process such as genetic combination, mutation, and natural selection in a design based on the concepts of evolution.

Nearest neighbor method: A technique that classifies each record in a dataset based on a combination of the classes of the k record(s) most similar to it in a historical dataset (where k ³ 1). Sometimes called the k-nearest neighbor technique.

Rule induction: The extraction of useful if-then rules from data based on statistical significance.

Many of these technologies have been in use for more than a decade in specialized analysis tools that work with relatively small volumes of data

2.1 Requirements of a Video Mining System:

The following requirements for a video mining system [5].

1. It should be unsupervised.
2. It should not have any assumption about the data.
3. It should uncover interesting events.

Note that requirements 2 and 3 are somewhat contradictory, since the notion of 'interesting' is subjective, and highly dependent on knowledge of the content. Our aim is to find out how few assumptions can make about the content without detecting events that are too general to be meaningful. This would help us understand the content, and help set up framework of systematic use of domain knowledge.

2.2 Video Classification

Classification is a way to categorize or sassing class labels to a pattern set under the supervision. Decision boundaries are generated to discriminate between patterns belonging to different classes. The data set is initially partitioned into segments and the classifier is trained on the former. A framework to enable semantic video classification and indexing in a specific video domain was proposed. A method for classification of different kinds of videos that uses the output of a concise video summarization technique that forms a list of key frames was present.

2.3 Video Clustering

Clustering is useful technique for the discovery of some knowledge from data set. It maps a data item into one of several clusters, where clusters are natural grouping for data items based on similarity metrics or probab8ility density models. Clustering consists of partitioning data into homogeneous granules or groups, based on some objective function that maximizes the inter-cluster distance. Video clustering has some differences with convential clustering algorithms, As mentioned earlier, due to the unstructured nature do video data, preprocessing of video data by using image processing g or computer vision techniques is required to get structured format features, Another difference in video clustering is that the time factor should be considered while the video data is processed.

Traditional clustering algorithms can be categorized into two main types: Partitioned and hierarchical clustering [6].Hierarchical algorithms determine all cluster at once. Hierarchical algorithms can be agglomerative ("bottom up") or divisive ("top down"). Agglomerative algorithms begin with each element as a separate cluster and merge them into successively larger clusters. Divisive algorithms begin with the whole set and proceed to divide it into successively smaller clusters.

III. CATEGORIES OF CLUSTERING ALGORITHMS

There are four main categories of clustering algorithms: partitioning, density-based, grid-based, and hierarchical.

3.1 Clustering Approaches

3.1.1 Partitioning algorithms

Construct various partitions and then evaluate them by some criterion (k-means, k-medoids)

3.1.2Hierarchical algorithms

Create a hierarchical decomposition of the set of data (or objects) using some criterion (AGNES, DIANA)

3.1.3 Density-based

Based on connectivity and density functions – grow a cluster as long as density in the neighborhood exceeds a threshold (DBSCAN, CLIQUE)

3.1.4 Grid-based

Based on a multiple-level grid structure (i.e., quantized space) (STING, CLIQUE)

3.1.5 Model-based

A model is hypothesized for each of the clusters and the idea is to find the best fit of the data to the given model (EM).

IV. IMAGE MINING

There are two major issues that will affect the image data mining process. One is the notion of similarity matching and the other is the generality of the application area. For a specific application area[7], associated domain knowledge can be used to improve the data mining task. Since data mining relies on the underlying querying capability of the CBIR system, which is based on similarity matching, user interaction will be necessary to refine the data mining process. With image mining we will consider the four broad problem areas associated with data mining: Finding associations, Classification, Sequential pattern and Time series pattern. With all these , the essential component in image mining is identifying similar objects in different images.

4.1 Image Mining Algorithm Steps:

The algorithms needed to perform the mining of associations within the context of image. The four major image mining steps are as follows:

1. Feature Extracting: Segment images into regions identifiable by region descriptors (blobs) ideally one blob represents one object.
2. Object identification and record creation: Compare objects in one image to objects in every other image. Label each object with an id. We call this step the preprocessing algorithm.
3. Create auxiliary images: Generate image with identified objects to interpret the association rules.
4. Apply data mining algorithm to produce object.

V. EXPERIMENTAL RESULTS

Figure 2. The model input frames of different types of test videos

Figure 3. Cluster the image

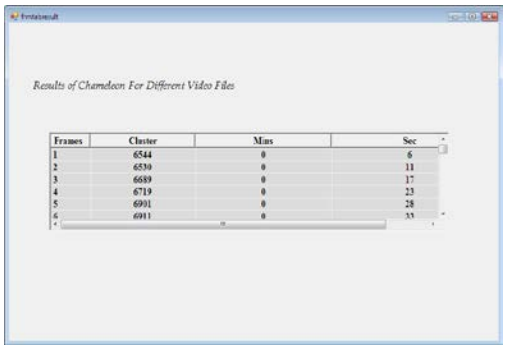

Figure 4. Different image cluster result

VI. CONCLUSION

Video data mining where it can be applied for many video applications to detect or retrieve the information. So this is the common process for video data miming. Future research work is to take a particular application and apply this Frame work for video data mining. The main goal of the future work is to develop the intelligence technique that can be used to support the video data mining process to retrieve information successfully and maintain the accuracy of the system.

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BIOGRAPHY

Mr.D.Saravanan working presently as Sr.Lectuer in Dept of MCA, Sathayabama University, Chennai, Tamil Nadu. He has 14 Years of Teaching Experience in Engineering College. Area of Interest is Data Mining, Image Processing, DBMS etc., He Guided 15 M.Phil Research Scholars and more than 100 Master Degree MCA and Engineering Projects in various Platform.

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