ISSN No. 0976-5697

Volume 1, No. 3, Sept-Oct 2010

International Journal of Advanced Research in Computer Science

RESEARCH PAPER

Available Online at www.ijarcs.info

Extraction of object from the video

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Abstract: In this modern computer world, mining plays an important role to extract the required information from the information galaxy. The information galaxy is termed as Data Warehousing. Not only data, but also there are more fields which has huge amount of information in the galaxy, and cant be retrieved form it. For these cases, we need the mining techniques.
Multimedia mining is one of the advanced mining technique. In Multimedia mining, Video Segmentation is one of the challenging area. The segmentation of video object from the video is termed as **Video Mining.** It deals with the extracting the role of the object of interest. There exists lot of papers which deals with video mining. But they contains more critical issues to do this mining. In the playing video, extracting the object of interest is a tedious process. So they cant satisfy the user requirements.
Concentrating on these problems and to do the video mining efficiently, we propose a new method in this paper. The new techniques adopted in this paper can able to capture / extract the object's role from the whole video content while it is playing. This becomes possible by providing the input as object of interest. The new technique is to search the role of the input object and capture it from the playing video. This technique makes this video mining process easy and it is effectively presented in this article.

Keywords: Data Warehouse, Information Galaxy, Multimedia Mining, Object of Interest, Playing Video, Video Mining, Video Segmentation.

I. INTRODUCTION

Modern computer technology deals with the new concept of Multimedia. Multimedia is one of the growing fields in this computer world. It plays many different roles in different way. Among several roles, video is one of the most progressing areas.

In the video, we can gain more information through visualization. Among the whole video, extracting a particular video object is a interesting feature. The process of extracting the particular video object from the video and analysis its role is termed as Video Mining.

The existing technique for video mining has some critical methods to implement it. They need above 10-15 algorithms to detect the object by eliminating the background. So it becomes tedious and the performance becomes low.

To improve the performance of the process and to make the video mining process reliable and effective, we adopt a new technique in this paper. This has the capability to identify the role of the object at all the places in the whole video, even if the particular object occurs after a long time. After detecting the object, it store the location in separate memory and increase the count. After completing the search, it list out all the locations and provide information about its role. Thus it plays an effective role in object searching and it is useful to implement in various areas.

The role of the object which is to be identified is provided as input and using this input, the searching takes places and returns the output.

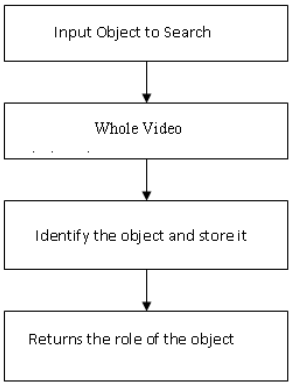

Figure 1: Process of mining the video

This fulfills all the user requirements in a simple and easy way. This process will also returns the total time duration of the object's role. Thus we can analyse the status and position of the object in the video.

This is useful in various fields such as cinema, cricket, office, hospital, bank, etc., to capture the role of a particular person. This paper explains the techniques used in video mining in a precious manner.

II. RELATED WORK

In paper[1] they describes an original method for classifying object motion trajectories in video sequences in order to recognize dynamic events. Similarities between trajectories are expressed from Hidden Markov Models representing each trajectory. They have favorably compared our method to several other ones, including histogram comparison, Longest Common Subsequence distance and SVM classification. Trajectory features are computed from the curvature and velocity values at each point of the trajectory, so that they are invariant to translation, rotation and scale. They have evaluated our method on two sets of data, a first one composed of typical classes of synthetic trajectories (such as parabola or clothoid), and a second one formed with trajectories obtained by tracking cars in a Formula1 race video.

Biometrics has become a "hot" area. Governments are funding research programs focused on biometrics. In the paper[2] the problem of person recognition and verification based on a different biometric application has been addressed. The system is based on the 3DSkull recognition using 3D matching technique, in fact that paper present several bio-metric approaches in order of assign the weak point in term of used the biometric from the authorize person and insure the person who access the data is the real person. The feature of the simulate system shows the capability of using 3D matching system as an efficient way to identify the person through his or her skull by match it with database, this technique grantee fast processing with optimizing the false positive and negative as well .

Lao et al. [3] perform 3D face recognition using a sparse depth map constructed from stereo images. Iso-luminance contours are used for the stereo matching. Both 2D edges and iso luminance contours are used in finding the irises. In this specific limited sense, this approach is multimodal. However, there is no separate recognition result from 2D face recognition. Using the iris locations, other feature points are found so that poses standardization can be done. Recognition rates of 87% to 96% are reported using a dataset of ten persons, with four images taken at each of nine poses for each person.

Achermann et al. [4] extend eigenface and hidden Markov model approaches used for 2D face recognition to work with range images. They present results for a dataset of 24 persons, with 10 images per person, and report 100% recognition using an adaptation of the 2D face recognition algorithms. Tsalakanidou et al. [6] report on multi-modal face recognition using 3D and color images. The use of color rather than simply gray-scale intensity appears to be unique among the multi-modal work surveyed here.

Results of experiments using images of 40 persons from the XM2VTS dataset [5] are reported for color images alone, 3D alone, and 3D + color. The recognition algorithm is PCA style matching, plus a combination of the PCA results for the individual color planes and range image. Recognition rates as high as 99% are achieved for the multi-modal algorithm, and multi-modal performance is found to be higher than for either 3D or 2D alone [7],[8].

In the paper[9] they propose a two-dimensional (2D) Laplacianfaces method for face recognition. The new algorithm is developed based on two techniques, i.e., locality preserved embedding and image based projection. The 2D Laplacianfaces method is not only computationally more efficient but also more accurate than the one-dimensional (1D) Laplacianfaces method in extracting the facial features for human face authentication. Extensive experiments are performed to test and evaluate the new algorithm using the FERET and the AR face databases. The experimental results indicate that the 2D Laplacianfaces method significantly outperforms the existing 2D Eigenfaces, the 2D Fisherfaces and the 1D Laplacianfaces methods under various experimental conditions.

During the past several years, face recognition in video has received significant attention. Not only the wide range of commercial and law enforcement applications, but also the availability of feasible technologies after several decades of research contributes to the trend. Although current face recognition systems have reached a certain level of maturity, their development is still limited by the conditions brought about by many real applications. For example, recognition images of video sequence acquired in an open environment with changes in illumination and/or pose and/or facial occlusion and/or low resolution of acquired image remains a largely unsolved problem. In other words, current algorithms are yet to be developed. The paper[10] provides an up-to-date survey of video-based face recognition research. To present a comprehensive survey, they categorize existing video based recognition approaches and present detailed descriptions of representative methods within each category. In addition, relevant topics such as real time detection, real time tracking for video, issues such as illumination, pose, 3D and low resolution are covered.

Automatic recognition of individuals is a significant problem in the field of pattern recognition. The face images considered for recognition undergo large variations due to changes in illumination conditions, viewing direction, facial expression and aging etc. The face images also have similar geometrical features and hence discriminating one face from the other in the database is a challenging task. Hence it is very difficult to represent face images with distinct feature vectors that are invariant to transformation.

Even though the extracted feature vectors possess overlapping characteristics, the problem may be
easily solved if there exists a feature extraction method which can generate distinct features for each class of image or a classification technique capable of discriminating the overlapping features of the images. In the paper[11] feature extraction techniques such as Fourier descriptors, Zernike moments, Hu moments and Legendre moments are considered and classification techniques such as Nearest Neighbor classifiers, Linear Discriminant Analysis classifiers and neural network classifiers are compared. From the comparative study the most suitable feature extraction approach and classification algorithms are identified for face recognition. All the feature extraction methods are tested with ORL database of 40 subjects and each of them with 10 orientations. The performance comparison is made among different approaches.

There have been a number of feature extraction approaches: (i) geometrical based (ii) statistical based approaches exist in literature to handle face images. Some of them are using Walsh transforms, Eigen faces, Discrete Cosine

Transforms [12] [13], Line edge maps, wavelet transforms, neural networks as feature extraction approaches. Still obtaining 100% recognition is difficult to achieve in practice due to the difficulty in representing face images with distinct and discriminate feature vectors. There are other feature extraction methods for image analysis based on moments gaining attention recently. Moments such as Hu moments, geometric invariant central moments, Legendre moments, Zernike moments, Pseudo Zernike moments [14], and Krawtchouk moments [15] are used recently for the analysis of images and they were proved to be suitable for handling images with binary patterns such as character recognition, palm print verification etc., under any geometric transformation. These moments possess the characteristics of translation, scaling and rotation invariance and hence they may be chosen for image analysis and pattern recognition applications. Among these moments, Pseudo Zernike moments was used along with features obtained from Principal Component Analysis(PCA) by Ahamadi et al. [16] for face recognition and produced a recognition rate of greater than 99% but still achieving 100% is a challenging task.

The authors used feature extraction methods such as Discrete Cosine Transforms, Fourier descriptors, Line edge map based feature extraction methods, geometrical feature extraction using SUSAN operator [17], Hu moments, Geometrical central moments, Legendre moments, Zernike moments and Krawtchouk moments and analyzed the complexity in feature extraction and performance of various features in recognition task. The comparative study made among the feature extraction methods such as Hu, Fourier descriptors, ernike moments, Legendre moments and Hybrid features obtained by combining Fourier descriptors and Zernike moments is presented in this paper.

In paper [18], they present a method for mining frequently occurring objects and scenes from videos. Object candidates are detected by finding recurring spatial arrangements of affine covariant regions. Our mining method is based on the class of frequent itemset mining algorithms, which have proven their efficiency in other domains, but have not been applied to video mining before. In this work they show how to express vectorquantized features and their spatial relations as itemsets. Furthermore, a fast motion segmentation method is introduced as an attention filter for the mining algorithm. Results are shown on real world data consisting of music video clips.

Advances in computing, networking, and multimedia technologies have led to a tremendous growth of sports video content and accelerated the need of analysis and understanding of sports video content. Sports video analysis has been a hot research area and a number of potential applications have been identified. In the paper[19], they summarize our research achievement on semantics extraction and automatic editorial content creation and adaptation in sports video analysis. They first propose a generic multi-layer and multi-modal framework for sports video analysis. Then they introduce several mid-level audio/visual features which are able to bridge the semantic gap between low-level features and high-level understanding. They also discuss emerging applications on editorial content creation and content enhancement/adaptation in sports video analysis, including event detection, sports MTV generation, automatic broadcast video generation, tactic analysis, player action recognition, virtual content insertion, and mobile sports video adaptation. Finally, they identify future directions in terms of research challenges remained and real applications expected.

In our paper, we consolidated and improve with more special features and propose our method.

III. METHODOLOGY

A. *Proposed Method*

The aim of the proposed method is to develop a technique to extract the object from the video, in order to analyses the role of the object.

The summary of the proposed method is as follows: The first step of the process is to get the input from the user. Treat this input as object whose role from the video is to be detected. Store this object in a memory and identify the pixel position of the object. Then the whole video is transformed into frames, such that each frame contains a single video object.

The next step is to compare the object in the frames with the input object. This comparison is done by matching each pixel of the two objects with each other. If there exists similarity, then store the position of the frame in which the object is to be detected along with the timeline. Then increment the count of the occurrence and then move on to the next frame and continue this process until we reach the last frame. If the frame object not matches with the input object, then leave the object from considerations and move on to the next frame.

After completed the search, the final step is to show the result of the video mining to the user. The result is in the form of list containing the position of the object in the video and the timeline. Thus video mining is useful to extract the object's role and provide the way to the user to identify and analysis the object position.

The proposed method also contains the following algorithm which works based on the given conditions:

B. *Algorithm*

Start the process

Step-1:

Get the input object to extract it from the video

Store it in frame

Step-2:

Identify the pixel position of the Input object

Step-3:

Play the video and transform it into the frame

Step-4:

```
For i = 1 to n-frames
{
        Compare each object with the input object
        If (input object == frame object)
           Count++;
           Timeline[frame++]=I;
}
```

Step-5:

```
For i = 1 to count
{
        Output_frame = timeline[frame(i)];
}
```

Step-6:
Analysis the object's role
Stop the process

C. Algorithm Explanation

The proposed algorithm for providing service to the customer is preceded as follows:

When the process starts, the input object is received from the user to start the mining. Store the input object in a frame. Then the whole video is transformed into separate frame. Compare each frame with the input frame. If both are equal, store it in separate output frame along with the timeline. Otherwise, move on to next frame.

Finally list the output of objects with separate frame along with time of occurrence. This is useful to analysis the object's role by the user. Thus video mining is carried out successfully.

IV. EXPERIMENTAL RESULTS

The implementation of the video mining is very essential to identify the object's role in a field/video. This technique is implemented in many growing fields such as cinema, sports, hospital, and so on.

In Cinema, video mining is used to extract the role of the particular actor and view his action in that particular film. Whereas, in the field of Cricket, it is easy to identify the participation of the player and watch his scores and activities. It is also easy to decide the scores such as boundary, six, out, etc.

In our real life, if it is used in functions, we can gather the information about the presence of the guest in our function. In case of Office, maintaining the attendance of the employee becomes easy and also find the duration of the employee work.

Thus the technique **"Video Mining"** is helpful in monitoring the object in a collection of videos.

V. CONCLUSION

The aim of the paper was to provide technique to mine the object from the video. The summary of the Video Mining is discussed in this paper successfully.

The video mining leads to great success in future. In this paper, we implement the technique to find the role of the single object and monitor the activities. This is useful to gather information about the single object. In future, it becomes efficient when it is used to mine multiple objects to gain more information about different things. Thus video mining is very much useful in this modern multimedia world.

In future, it becomes more effective, if we take better steps. Thus we conclude this paper.

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