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Survey on Graph-Based Video Sequence Matching &BoFs method for Video Copy Detection

Avinash H. Kakade
M.E. Computer Network-II,
G.H Raisoni college of Engineering,Ahmednagar

Prof. JadhavMeenal.
Assistant Professor (Computer Engineering Dept.)
G.H Raisonicollege of Engineering & Management Wagholi, pune.

Abstract— Number of videos are uploaded daily on different web servers like you-tube. From such videos there may chances of uploading the duplicate video or modified videos. There is some copy right videos are uploaded from reputed institutes and industries which may download by unauthorized one and re-uploaded on server which may affects their standards. To avoid such misuse of copy right videos there are different techniques invented which are basically detectscopied videos respect to the content of the videos. Such techniques uses different methods and algorithms like SVD, SIFT features and BOFs techniques. These techniques work over contents i.e. images of the videos and detects the copy of video after comparing binary values (Features) extracted from the frames/images of the videos. Due to such techniques it's possible to detect the copied video on particular motion or activity.

Keywords— Dual threshold, SIFT Features, Visual Cues, CBCD, Facial Detection, SVD, Inverted files,LSH.

INTRODUCTION

Content Based Video Copy detection (CBCD)is a challenging problem in computer vision due to the following reasons. First of all, the problem domain is exceptionally wide. Depending on the purpose of a video copy
Detection system, different solutions can be applied. For example, Facial Detection and activity based detection can detects the exact copy of particular face and also detects the particular activity in the video[1] .On the other hand, matching news stories across different channels (camera viewpoints) is a totally different problem, and will probably require interest point matching techniques.In such situation extracting binary SIFT features [2]from the key frames and comparing them using different method like SVD(Singular Value Decomposition)[2] will detects the copied video robustly. To reduce the time complexity and to avoid large database searching, LSH (Locality Secure Hashing) [3] provides better solution. At point of view to reduce large database searching different storage structures are invented like Inverted file structure .Therefore, no general solution can be proposed to video copy detection problem. Secondly, the problem space is extremely large, which often requires real-time solutions.

RELATED WORK

O. Kucuktunc et al[1] states thatmostly video copy detection techniques need to extract the frames and feature values from the video. Different methods are used to extract key features from the different types of videos.Video copy detection using multiple visual cues detects the copied videos by fusing the result of three different techniques.First technique is facial shot matching in which high level facial detector identifies facial frames/shot in video clips. Matching face with extended body regions gives the flexibility to discriminate the same person in different scenes.Second technique is activity sequence matching in which a spatio-temporal sequence matching technique is employed to match video clips that are similar in terms of activity.Lastly, the non-facial shots are matched using low level MPEG-7 descriptors and dynamic-weighted feature similarity calculation. The proposed framework is tested on the query and reference dataset of CBCD task of TRECVID 2008.

Advantages:

- Detects exact matching of facial & activity based videos.
- Non facial shots are also detected by using MPEG-7 descriptor.

Disadvantages:

- Not able to detects changes in rotation and scale invariant in video.

M. Douzeet al [2] states thatthis technique introduces a video copy detection system which efficiently matches individual frames and then verifies their spatio-temporal consistency. The approach for matching frames relies on a recent local feature indexing method, which is at the same time robust to significant video transformations and efficient in terms of memory usage and computation time. We match either key frames or uniformly sampled frames.This system addresses the problem of searching for strongly deformed videos in relatively small datasets. The first step consists in extracting local signatures for a subsample of frames from the video. A query is then performed using a structure derived from text retrieval: the inverted file.

Advantages:

- Better work for finding spatial temporal results
- Query retrieval is fast by using inverted file structure.

Disadvantages:

- Only matches individual frames with respect to spatial movement.
- Cannot work with large size videos and databases.
- Limited for only spatial temporal image result.

G. Willems et al [3] states that this technic uses content based video copy detection based on the spatial temporal features value.The use of local spatio-temporal features instead of purely spatial ones brings additional robustness and discriminativelyThis system begins with splitting video into small frames. After dividing the video into frames the local features are extracted from each frame.The orientation of the video as well as the speed is almost never changed, however, and as such invariance to in-plane rotation and changes in the temporal scale are not valuable traits. Because of this reason this technique choose the smallest temporal scale possible which has a kernel width of 9 frames and choose the typical magnification radius of 3, which means that each descriptor is computed over 27 frames.For Indexing and retrieving of high-dimensional data on a large-scale is far from trivial as exact nearest-neighbor searches suffer from the curse of dimensionality. LSH (Locality Secure Hashing) is such an approximate high dimensional similarity search scheme which is able to find matches in sub linear time. It is able to avoid the curse of dimensionality by hashing the descriptors through a series of projections onto random lines and concatenating the results into a single hash.

Advantages:

- Extract binary unique fingerprint from each frame.
- Retrieval result is fast and unique by using LSH method.
- High dimensional similarities detected.

Disadvantages:-

- Similarity between two different videos not detected.
- Only same videos are detected as copied.
- Video within video not detected.

E. Delponte et al[4] states that in this technique a version of the SVD-matching proposed by Scott and Languet- Higgins and later modified by Pilu that we elaborate in order to cope with large scale variations. To this end we add to the feature detection phase a key point descriptor that is robust to large scale and view-point changes. Furthermore, we include this descriptor in the equations of the proximity matrix that is central to the SVD-matching.According to the length of video, numbers of segments are extracted from the video. But any type of video is made up of large number of frames so there is need to select key frames from extracted segments/frames. Key frame selected on the base of similarity between its next and previous frames.This technique extract the features from the key frames called as SIFT features and then its singular value is calculated to match the SIFT feature point sets of images. This technique works on the base of timestamp of the video.

Advantages:

- Frames count reduced due to key frame selection.
- SVDvalue remains unique for each key frame..
- Detects the variation between the frames.
- Detects the change in rotation, scale change.

Disadvantages:

- Video in video not detected.
- Calculation of SVD value is complex task.

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CONCLUSION

In this paper we studied different techniques used for content based video copy detection. Most of them works on the contents of the video i.e. frames/images. Detection of the copied video based on its contents includes use of complex algorithm which is disadvantage of such technique because they needs more time to execute. They need to work on the segments and then selected key frames are used to extract the features value. There is need to develop the new technologies which may detects copied video inn less time and provides better protection.

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