ROBUST TECHNIQUE FOR VIDEO RESEMBLANCE CHECKING

BALAJI GUGULOTH,
Assistance Professor,
Department of Computer Science and Engineering,

BHOOKIYA NAVEEN,
Assistance Professor,
Department of Electronics and Communications Engineering,

Siddhartha Institute of Technology and Sciences,
Narapally, Hyderabad, Telangana – 500 088.

ABSTRACT

Video resemblance checking is the most time-consuming and cost-effective procedure. Effective and quick manipulations of huge video files are becoming increasingly desirable as the demand for visual information of rich material grows. Several experiments on content-based video retrieval have been conducted. Despite its importance, video subsequence identification, which entails finding information in a long video sequence similar to a short query clip, has received little attention. This paper proposes a graph transformation and matching solution for this problem in order to detect potential changes in ordering. A bipartite graph is employed to express the mapping relationship between the query and database video, which is then used to locate related frames using a unique batch query approach. The closely matching chunks of the long sequence are then recovered using a filter-and-refine search approach, and certain irrelevant subsequences are pruned. During the filtering stage, Maximum Size Matching decreases the number of candidates by producing subgraphs from the query and candidate subsequences. Sub-Maximum Similarity Matching is used during the refinement phase to select the subsequence with the highest aggregate score among all candidates, using a comprehensive video similarity model that takes into account visual content, temporal order, and frame alignment information.

I. INTRODUCTION

All existing multidimensional sequence similarity measures, such as normalised pair wise distance (Mean distance), Dynamic Time Warping, Longest Common Subsequence (LCSS), or Edit distance and its weighted extension Edit distance with Real Penalty (ERP), are insufficient in some aspects for the specific problem of measuring video similarity when dealing with temporal order, frame alignment, gap, and noise together. Our technique has the benefit of not only capturing visual content using average distance between frame pairs, but also taking temporal order and frame alignment into account.

Because it can account for the cross mapping relationship in the presence of 1, it differs from the widely used Edit distance due to its tolerance to element permutation. Free-to-air broadcasting content can be saved and used for research purposes under Australian copyright laws.

When compared to other approaches, our approach offers the following advantages:

1. Unlike the fast sequential search method that uses temporal pruning to speed up the search process and assumes that the query and target subsequences are strictly of the same ordering and length, our technique uses spatial pruning to avoid comparing all of the feature vectors in the database.
2. Unlike the suggestions based on shot boundary detection, our technique does not need the pre-segmentation of video. Shot resolution, which might be a few seconds long, is frequently too coarse to reliably pinpoint a subsequence border. Meanwhile, our frame subsampling-based technique is capable of detecting video information with uncertain shot boundaries (such as dynamic commercial, TV programme lead-in and lead-out subsequences).

II. RELATED WORKS

It is feasible to efficiently and correctly discover coderivatives by utilising dynamic programming to detect regions of similarity in video signatures, even if these regions only make up a small portion of the clip being searched. Based on how the video evolves over time, we present four novel ways for creating tiny video signatures. Such features, it is assumed, will be kept even if the video is severely damaged. We show that substantial changes in video bitrate and resolution, two characteristics that are frequently changed while reencoding, have no effect on these fingerprints.

We present a video signature that is resistant to changing compression formats, compression ratios, frame sizes, and frame rates and is based on an ordinal measure of resampled video frames. We devised a coarse-to-fine signature comparison scheme for successful localisation of a short query video clip in a long target video using the proposed video signature. In the coarse searching step, positions are generally matched based on sequence shape similarity, whereas in the fine searching step, dynamic programming is used to manage similarity matching in the event of missing frames, and temporal editing methods are used on the target movie.

To detect duplicates of a video clip, this research provides a unique sequence matching approach. If a video copy detection system is to be effective, it must be resistant to the numerous digitising and encoding procedures that result in a variety of distortions, such as changes in brightness, colour, frame format, and various blocky artefacts. Most of the video copy detection methods published thus far are primarily concerned with signal distortions caused by various encoding settings; however, these algorithms do not perform well when converting across display formats. The authors presented a copy-detection system that is resistant to the distortions indicated above.

III. PROPOSED SYSTEM

Given a query in the form of "ABCD," our method can correctly rank a video "ACBD" higher than "AADD," while Edit distance scores them equally with respect to the query. Therefore, our method can better resemble the "similar" notion of human perception. Good performance has also been demonstrated in the experiments. Further search videos with changes from query due to content editing, a number of algorithms have been proposed to evaluate video similarity.

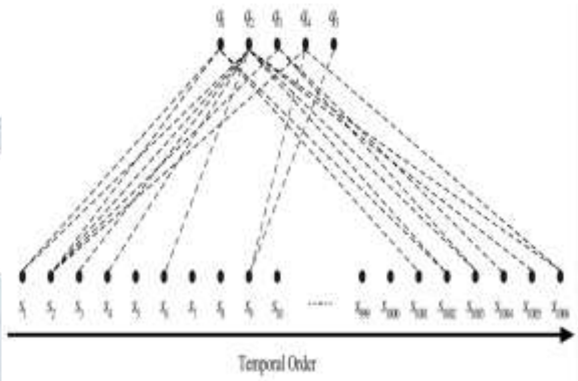

Figure 1: Construction of bipartite graph

It differs from the widely used Edit distance in that it can account for the cross mapping connection in the presence of content reordering due to its tolerance to element permutation.

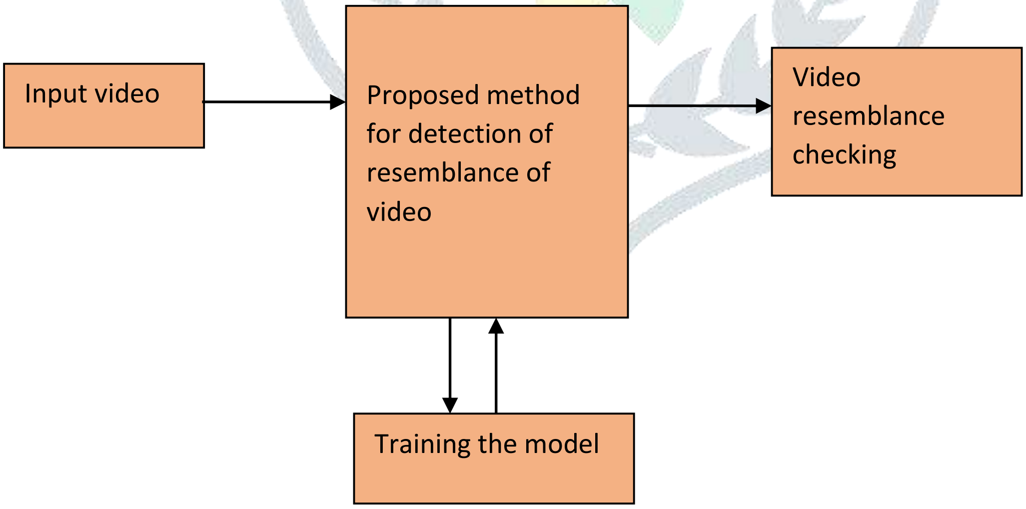

Figure 2: Flow of proposed work

Given a query in the form of "ABCD," our method can correctly rank a video "ACBD" higher than "AADD," while Edit distance scores them equally with respect to the query. Therefore, our method can better resemble the "similar" notion of human perception. Good performance has also been demonstrated in the experiments. Further search videos with changes from query due to content editing, a number of algorithms have been proposed to evaluate video similarity.

IV. RESULT AND DISCUSSION

Table 1 shows the memory consumption of various methods.

Table 1: Memory consumption vs query

Type of Query	Memory consumption		
	Tumbling window	Sliding window	Tripled window
Select query	37	22	12
Aggregation query	42	28	17
Query with joins	65	55	45

Figure 3: Comparison of memory consumption for types of query

Figure 3 shows the comparison of memory consumption for types of query like select query, aggregation query and query with joins.

V. CONCLUSION

Our video similarity model which elegantly achieves a balance between the approaches of neglecting temporal order and strictly adhering to temporal order is particularly suitable for dealing with this case, thus can support accurate identification. For the future work, we plan to further investigate the effect of representing videos by other features, such as ordinal signature. Moreover, the weight of each factor for measuring video similarity might be adjusted by user feedback to embody the degree of similarity more completely and systematically.

REFERENCES

[1] Kashino, K., Murase, H. (2003) “A Quick Search Method for Audio and Video Signals Based on Histogram Pruning,” IEEE Trans. Multimedia, vol. 5, no. 3, pp. 348-357.

[2] Mohan, R. (1998) “Video Sequence Matching,” Proc. IEEE Int’l Conf. Acoustics, Speech, and Signal Processing (ICASSP ’98), pp. 3697-3700.

[3] Naphade, M.R., Yeung, M.M., Yeo, L. (2000) “A Novel Scheme for Fast and Efficient Video Sequence Matching Using Compact Signatures,” Proc. Storage and Retrieval for Image and Video Databases (SPIE ’00), pp. 564-572.

[4] Peng, Y., and Ngo, C.W. (2006) “Clip-Based Similarity Measure for Query-Dependent Clip Retrieval and Video Summarization,” IEEE Trans. Circuits and Systems for Video Technology, vol. 16, no. 5, pp. 612-627.

[5] Pua, K.M., and Miadowicz, J.Z. (2004) “Real Time Repeated Video Sequence Identification,” Computer Vision and Image Understanding, vol. 93, no. 3, pp. 310-327.

[6] Shao, J., and Huang, Z.(2008), “Batch Nearest Neighbor Search for Video Retrieval,” IEEE Trans. Multimedia, vol. 10, no. 3, pp. 409-420.

[7] Smeulders, A.W.M., Worring, M., Santini, S. (2000) “Content-Based Image Retrieval at the End of the Early Years,” IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 22, no. 12, pp. 1349-1380, Dec.

[8] Shen, H.T., Zhou, X. (2007) “Uqlips: A Real-Time Near-Duplicate Video Clip Detection System,” Proc. 33rd Int’l Conf. Very Large Databases (VLDB ’07), pp. 1374-1377.