PROCESSING VIDEO-BASED QUERIES IN A VIDEO STREAM

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ABSTRACT

If you have a large database, video resemblance checking is the most time-consuming and cost-effective task. Effective and fast manipulations of big video datasets are becoming increasingly desirable as the demand for visual information of rich content grows. Many studies on content-based video retrieval have been conducted. Despite its usefulness, video subsequence identification, which involves finding information that is comparable to a small query clip in a large video sequence, has received little attention. This work proposes a graph transformation and matching solution to this problem, with the goal of detecting the occurrence of potentially changed ordering or length as a result of content alteration. The mapping link between the query and database video is initially represented by a bipartite graph using a novel batch query approach to find related frames. The closely matched sections of the long sequence are then retrieved, and certain irrelevant subsequences are pruned using a filter-and-refine search approach. Maximum Size Matching is used during the filtering stage to reduce the number of candidates by constructing subgraphs from the query and candidate subsequence. Sub-Maximum Similarity Matching is used during the refinement step to find 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

Similarity search is the process of answering questions that are "alike" but not "quite" "same." It's been commonly utilised to replicate human-assisted processes like image retrieval and time series matching, which require object proximity rating. Many applications of video databases are becoming more popular as a result of rapid improvements in multimedia and network technologies, and sophisticated techniques for encoding, matching, and indexing movies are in high demand. A video sequence is an ordered collection of a large number of frames, and each frame is often represented by a high-dimensional vector abstracted from some low-level content elements inside the original media domain, such as colour distribution, texture pattern, or shape structure.

Searches among these feature vectors are frequently used to match videos. In practise, manually checking if a video is part of a long stream by browsing the entire duration is typically unsatisfactory; hence, a trustworthy solution for automatically finding related content is essential. The most comparable component of a long prestored video sequence S is identified by identifying the position of the most similar part with respect to a user-specified query clip Q. Even if there is some transformation distortion, partial content rearrangement, insertion, deletion, or replacement, it should be able to detect relevant footage.

The following are some of its most common uses: Owners of video content would wish to be informed of any usage of their work in any medium or representation. For example, movie scene creators may want to know if and where their original films have been reproduced by others, even if it involves some type of remixing for multimedia authoring TV commercial detection. Some businesses may like to follow their TV advertising as they air on various channels over a period of time in order to compile statistics. They may check to see if their commercials were broadcast as promised, and it's also useful to watch how their competitors run ads in order to understand their marketing techniques.

II. RELATED WORKS

An effective video copy detection algorithm should be able to handle spatiotemporal variations (such as changes in brightness or frame rates) while also reducing computing costs. While most research focus on spatial changes, they pay less attention to temporal fluctuations and computing costs. To solve the aforementioned difficulties, we present a video copy defection method based on time warping. To deal with video temporal changes, a time warping matching method is implemented. A fast filtering method to produce key frames and select candidate clips from video is described to reduce matching times. Our experiments show that the proposed method yields promising outcomes.

Because of the widespread availability of video content on the Internet, similarity detection has become an essential tool for Web data management, searching, and navigation. We offer a number of algorithms for measuring video similarity effectively. Video is defined as a collection of frames expressed as high-dimensional vectors in a feature space. Our goal is to determine ideal video similarity (IVS), which is defined as the percentage of comparable frame clusters shared between two video sequences. We use Voronoi video similarity (VVS) to approximate IVS because it is too difficult to be used in large database applications. VVS is defined as the volume of the intersection of Voronoi cells of similar clusters.

III. PROPOSED SYSTEM

In practise, due to content manipulation, visually comparable videos may have various orderings, resulting in certain inherent cross mappings. Our video similarity model, which neatly finds a compromise between the approaches of disregarding temporal order and rigorously adhering to temporal order, is particularly well suited to dealing with this issue and may thus facilitate reliable identification. Despite the fact that our studies only used the colour feature, the proposed approach automatically accommodates other features.

Creation of frames from video sequence

A video sequence is an ordered collection of a large number of frames, and each frame is often represented by a high-dimensional vector abstracted from some low-level content elements inside the original media domain, such as colour distribution, texture pattern, or shape structure. Videos are handled as though they were a "bag" of frames.

Implementing Novel Batch Query Method

The mapping link between the query and database video is initially represented using a novel batch query approach to retrieve similar frames. The suggested query processing is done in a coarse-to-fine way to effectively but still efficiently discover the most similar subsequence. To quickly filter some truly non-similar subsequences with lesser computing cost, a one-to-one mapping constraint similar to that of Maximum Size Matching (MSM) is imposed. For correct identification, the lower numbers of candidates that contain eligible numbers of comparable frames are further analysed with a higher computational cost. Because assessing video similarities for all possible 1:1 mappings in a sub-graph is computationally infeasible, a heuristic method called Sub-Maximum Similarity Matching (SMSM) is created to quickly select the subsequence corresponding to the best 1:1 mapping.

Implementing Filter-and-Refine Search Method

The closely matched sections of the long sequence are then retrieved, and certain irrelevant subsequences are pruned using a filter-and-refine search approach. To produce a smaller collection of candidates, Maximum Size Matching is used during the filtering stage for each sub-graph constructed by the query and candidate subsequence. Sub-Maximum Similarity Matching is used during the refinement step to find 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.

Generation of Matched Sequence Clip

Finally, we look into sub-sampled frame-based matching, taking into account average inter-frame similarity as well as temporal order, frame alignment, gap, and noise in order to achieve reliable identification. Without enumerating all permutations, an efficient heuristic technique is designed to combine the scores of multiple elements for immediately determining the most similar subsequence according to this overall video similarity measure. The matched sequence clip will be generated from the new frames using these calculations and weights.

IV. RESULT AND DISCUSSION

Table 1 shows the accuracy comparison of various methods like LPTA+, ETKS and proposed method.

Table 1: Accuracy comparison

Input data	accuracy		
	LPTA+	**ETKS**	**Proposed method**
100	55	30	35
200	57	39	45
300	59	52	62
400	61	67	69
500	62	72	78

Figure 1 shows the memory consumption of various methods.

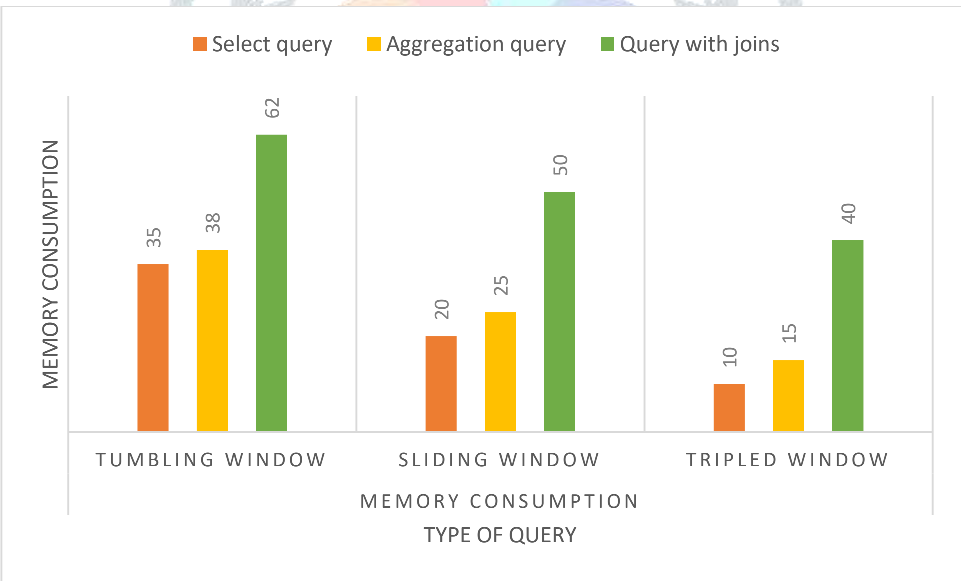

Figure 1: Memory consumption of various methods

V. CONCLUSION

A query processing technique for temporal localization of similar content from a long unsegmented video stream has been given, taking into account that the target subsequence may be approximate recurrence of potentially different ordering or duration with query clip. A batch query algorithm is used to retrieve similar frames of the query clip in the early phase.

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