"Web Multimedia Data Search Optimization Using Fibonacci-Tree Method"

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Abstract - Web multimedia consists of vide varieties of different object data types, characteristics and attributes. Multimedia content optimization is one of the important ongoing research areas in the field of computer vision and multimedia. Multimedia content search optimization on the web need to be started by defining method for multimedia object differentiation and then identifying right approach for search optimization. The proposed research experiment presents an algorithm for achieving better and faster search optimization, which subsequently superimposed on any of huge multimedia content management system or on the web. Multimedia object differentiation, search and retrieval algorithm for optimization is derived based on mathematical modeling approach and the outcomes can be mapped onto any vast integrated multimedia contents.

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I. INTRODUCTION

Multimedia data representation and retrieval is a complex process due to complex data structure and huge information matrix [1]. Many researches have been carried out in the area of multimedia data representation and information retrieval on the web. Despite differentiated by geometric data representation, multimedia objects consists of complex data structure formation during the content design process. Video as a part of multimedia component consists of multiple frames and large size of information. On the other hand, compared to video, presence of image information in any multimedia content system will always be small in size. Audio data is large in size when compared to images. Volume of text information will be more but text information occupies less data size. Hence searching multimedia component on the web is a time consuming processes [2]. Multimedia object search optimization consists of various representation models, since location of multimedia objects on the web may change its positions, orientation over a period of time [3].

Searching of image objects, animation parameters, 2D transformations, 3D positions related to multimedia data poses complex situations [4]. Searching multimedia objects like audio, video and image with compressed contents, key frame animated objects, three-dimensional motion parameters and creates abrupt challenges. Tracking and locating of multimedia object in a better way can be done by properly establishing multimedia data association of objects between various components with in the contents. For the very reason, object sequences are used as an input for the process must be differentiated.

Number of methods namely sequential, binary, multiple hypotheses, nearest neighbor, graphing matching has been recommended to solve the searching problems, but all these finding suggests sequential multimedia object inputs [5]. Proper identification and righteous method of multimedia object inputs helps to establish faster and accurate search methods from a very large multimedia information system.. Hence different algorithm based multimedia data input derives different object representation and different search techniques. Further, it is observed that various tree based algorithm techniques can be superimposed on different steps involved right from image data searching, audio and video data searching, animation data locating and text data identification and retrieval.

II. OVERVIEW OF MULTIMEDIA OBJECT SEARACHING SYSTEM ON THE WEB

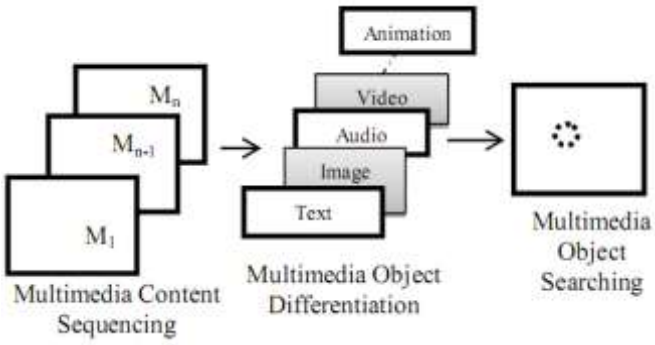

Fig. 1 Basic Block – Multimedia Object Searching on the web

From Fig 1, at first multimedia contents are arranged or sequenced and then forwarded for differentiation. Types of multimedia content chosen for sequencing will have the impact on the output of the subsequent step.

During the multimedia content sequencing phase, multimedia objects are arranged or ordered sequentially. Since the overall availability of multimedia components on the web or on the web content management system are very large, hence data representations are also complex due to varieties of data are involved. Each content has its own multimedia objects but object position, orientation and appearance may be different. The multimedia object indexing may not be fixed, in case of multimedia objects are embedded [4]. Further multimedia object formation on the web also depends on the type of tools used for designing multimedia objects, types of tools and techniques used for representing these multimedia objects on the web.

During multimedia object differentiation phase, object differentiations are being determined by differentiation technique applied on to the available types of each multimedia objects with reference to other multimedia objects on the web. The objects are then identified and sequenced based on the types, whether the objects are text, image (3D or 2D), audio or video etc.[5]. With reference to the images, the presence of images on the web may be of two-dimensional or three-dimensional [6]. Multimedia object differentiation allows user to sift multimedia content by object. In other word, multimedia object differentiation helps to search, identify and indexing of different types of multimedia objects on the web.

In case of multimedia object searching phase, representation of one or more objects within the block of contents is being estimated. Further single object searching or multi object searching can be performed using various algorithms and techniques [7]. Based on interactivity, multimedia object searching algorithms are further divided into manual, automated and interactive.

The beginning of entire multimedia object searching process starts with multimedia object differentiation [8]. The research identifies three basic method of multimedia object differentiation. They are sequential, random and algorithmic as shown in Figure 2.

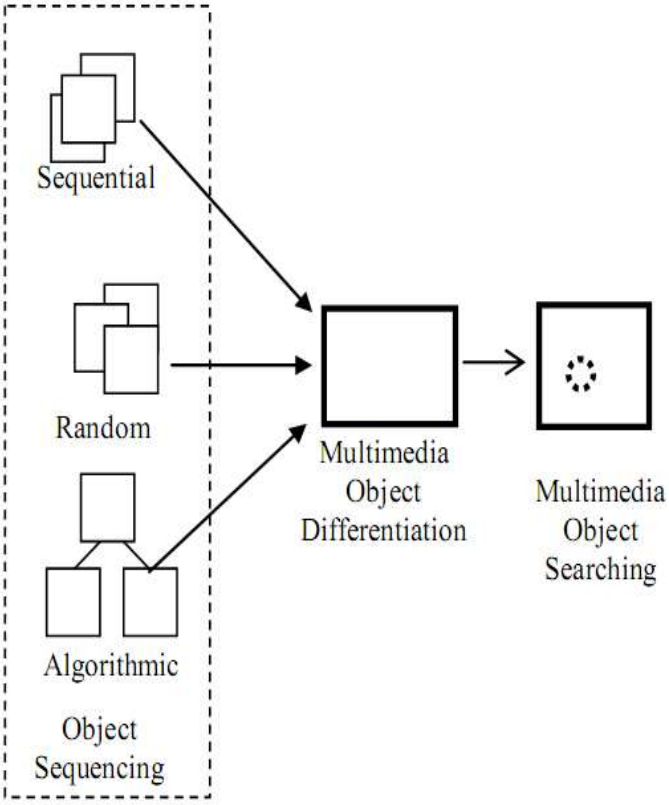

Fig. 2 Multimedia object differentiation methods

From Fig. 2, in sequential method, multimedia objects are sequentially arranged. In most cases multimedia objects in any multimedia contents on the web will be in the mixed format. Hence categorizations or indexing of these multimedia objects and sequencing will be carried out during these phases. Without altering the sequences, the original indexed sequences are forwarded for multimedia object differentiation phase. Multimedia object comparison or data association between multimedia objects can be done on the first object set and the next succeeding object. Hence multimedia objects are traced and identified sequentially from one group of contents to another. Sequential multimedia object representation method is a slow process and to search position of object in nth object, n number of minimum operation must be performed sequentially.

Using random multimedia object sequencing method, objects are randomly arranged and then selected to forward as an input to the multimedia object differentiation process. All the multimedia object sequencing outputs are directed to object differentiation process and then to object searching.

Using algorithmic method, various tree based algorithms are defined for better and efficient way of multimedia differentiation on the web. Each algorithmic method consists unique way of object sequencing methods. Hence rather than to sequencing multimedia objects in defined manner, these methods facilitate the multimedia objects arrangement as per defined algorithm and then forward it to the input of multimedia object differentiation phases

The research identifies an algorithmic based technique for multimedia object searching to achieve faster results. This technique can be super imposed during multimedia object differentiation phase and multimedia object searching stages to achieve faster and accurate results.

III. FIBONACCI-TREE METHOD FOR MULTIMEDIA OBJECT SEARCH OPTIMIZATION

Fibonacci-tree methods are named due to its natural characteristics and algorithmic approaches [9]. In this method, multimedia objects are differentiated using any suitable differentiation methods or Fibonacci-tree method during differentiation phase. Once the multimedia object differentiations are completed, then the multimedia object searching needs to be done. For multimedia object searching, it is possible to use any search engine algorithms or methods. But, while searching multimedia objects on the web, if the user follows the Fibonacci-tree algorithm technique, the result will be faster and accurate. Note that fibonacci-tree techniques can be superimposed during object differentiation phase or object searching phase or both.

Fibonacci-tree methods are usually recommended during multimedia object differentiation phases and multimedia object searching phases for optimization.

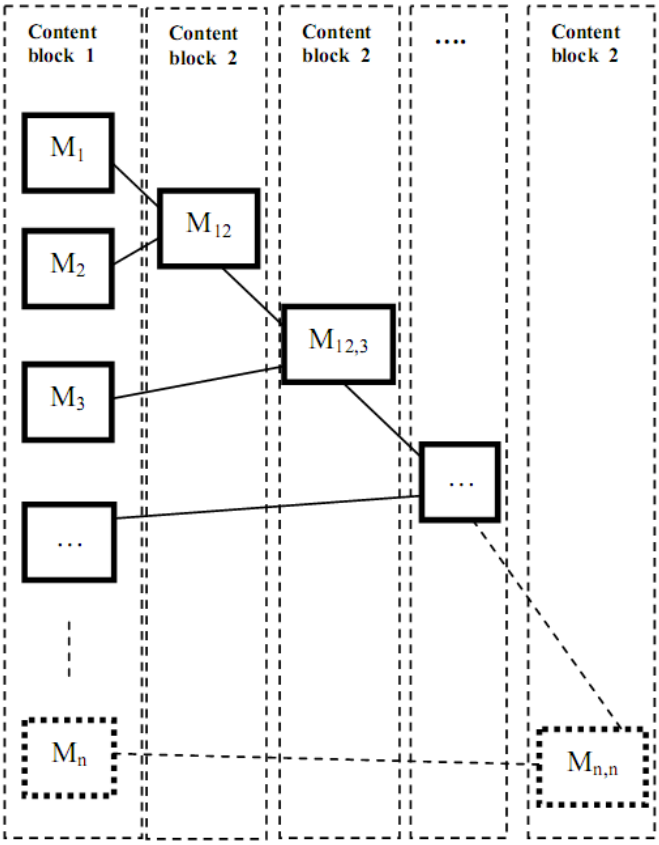

Fig.3 fibonacci-tree algorithm representation

Since the multimedia objects consists of huge data structures, searching multimedia components on the web using fibonacci-tree algorithm is more powerful, but time consuming.

From the Fig. 3,

M = M1,M2,M3,M4,….Mn

Where M is a Multimedia Object and if it is defined as a function, then

F(M12)= F(m1).F(m2)

F(M12,3)= F(m12).F(m3)

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F(Mn)=F(mn-1).F(mn)

Therefore F(M) ≈ F(mn-1).F(mn)

Hence using this model, it is possible to search the multimedia object by comparing one multimedia object in the content over the next multimedia object in the same contents. Indexed searching of multimedia objects can be done using any available valid method, but while searching the multimedia object, if the fibonacci-tree techniques are used, faster and accurate results can be achieved.

From the above figure,

Let M be the multimedia object available in the web content, then

Mn = ∇ (Mn-1,Mn) where n>1

At the beginning of 1st multimedia object comparison

Fn(M)= $\sum_{k=1}^{\frac{n-1}{2}} \binom{n-k-1}{k} m^{n-2k-1}; n \in N$

If the repeating occurrences is symmetry, then

Fn(-m)=(-1)nFn(m); n $\in$ M

Fn(m)=(-1)n-1Fn(m); n $\in$ M

Hence fibonacci-tree method can be superimposed on any of multimedia object used for multimedia object differentiation and object searching procedures on the web. Various methods of multimedia object differentiation and searching based on image resolution, image attributes, video attribute, audio attribute, text representation and object searching model can be implemented using fibonacci-tree techniques, which in terms helps to achieve the better and faster results.

IV. EXPERIMENT AND DISCUSSION OF RESULTS

Multimedia data search from a huge content system require more time than any general text data search phenomenon [9[. The proposed method has been tested on various multimedia object search optimization for the web.

Observe that Fibonacci-tree method search capabilities found better than general method like sequential search [10]. It has been observed that for the embedded multimedia object, optimized performance was better than external loading.

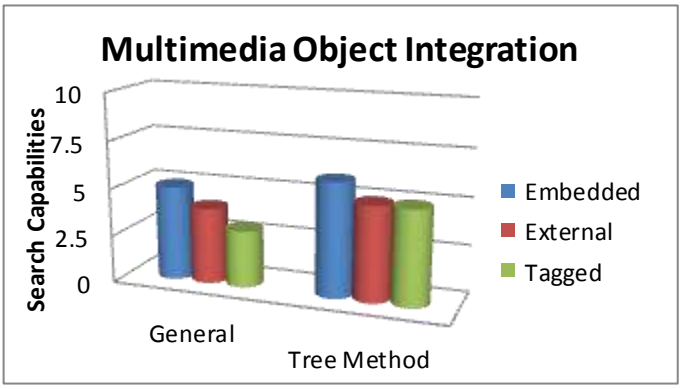

Fig 4. Web Multimedia Integration Performance Comparison

When search criteria applied for various multimedia data types, it is observed that tree method search performance is superior to general sequential or random search methods.

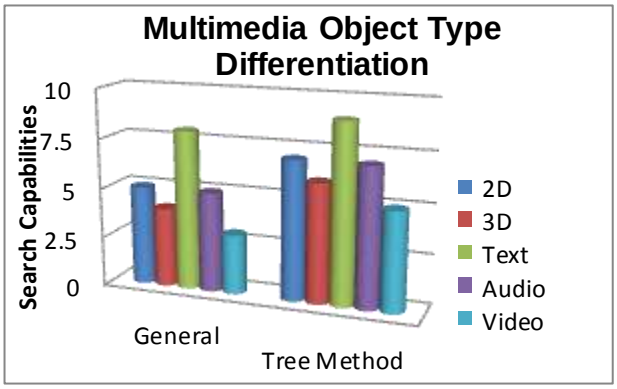

Fig 5. Web Multimedia Object Search Performance Comparison

V. CONCLUSION

This paper presents a unique technique used for web multimedia data object searching for achieving faster results. The proposed algorithmic based fibonacci-tree technique can be integrated in various steps pertaining to multimedia object differentiation and retrieval procedures as well.

The proposed fibonacci-tree technique can be further extended and used in indexing, searching and tracking multimedia information related to large multimedia documents, interactive multimedia contents consisting of multiple objects and multimedia authoring framework.

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