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A Survey on Various Approaches for Multimedia Search Engines

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ABSTRACT

Now a days searching of images and video on internet are very popular, but most of the times searching result not exactly matches with the searched key. Re-ranking, as an effective way to improve the results of web based multimedia search. This is adopted by commercial search engines such as Google. The proposed re-ranking approach is capable to work with all multimedia types: video, image, and audio. The search engines are mostly based on text and constrained as the user search by keyword which results into uncertainty among multimedia. Due to which noisy or irrelevant images or video are present as retrieved results. The purpose of multimedia search re-ranking is to reorder retrieved elements to get optimal rank list. So for that group of descriptors are used with weight and weight are assigned to it dynamically for getting accurate multimedia files. In this paper we discuss different methods for web multimedia re-ranking and propose new re-ranking technique to acquire the accurate query result and result shows that it retrieves most relevant files to the top.

Keywords : Re-Ranking, Multimedia Retrieval, Audio-Video Feature Extraction

I. INTRODUCTION

In the past few years, internet has been spread widely all over the world and because of its multimedia database on the internet has become huge. Searching the right image, video or audio from such a huge database is a very difficult task. Mainly there are two approaches used by internet scale search engines. First is text-based image search. Many commercial internet scale multimedia search engines use this approach. They use only keywords as queries. Users type query keywords in the hope of finding a certain type of multimedia.

The multimedia Re-ranking is an efficient technique to improve the results of web based image, video or audio search. It has been implemented by existing industrial search engines like Google, Bing and so many. For a given query keyword, search engine re-ranks the group of multimedia based on the query. Then the user picks a particular multimedia from the set, the rest of the multimedia are re-ranked based on the user selected multimedia.

It is popular in all types of search engines. But it gives ambiguities in result. Example user has entered query 'Sony', so as the entered query is not specific system can retrieve images like Sony logo, Sony TV or videos on Sony TV knowledge about query keyword else he can't get useful images. The semantic meaning of query keyword may be different than intended. The search engine provides additional text keyword suggestion when user enters the query its advantageous but it may possible that user may get diverted from its way. Sony Mobile, Sonycompany images etc.

Multimedia search is a broadly growing feature of well-known search engines namely `Google', `Yahoo', `Bing', etc. For a given text query, the search engine has to search for millions of images, video and audio for retrieving the significant multimedia as early as possible. Generally, the search engines are based on using text meta-data namely keywords, tags or text descriptions close to the multimedia. As the meta-data do not constantly be in associate to the visual term of the multimedia, the retrieval of multimedia is normally grouped with unwanted non-relevant multimedia.

A process in which images, audio, video are retrieved, arranged as per their features and user need is called web multimedia re-ranking. To facilitate access to the rapidly growing collection of multimedia on the Web and exploit their benefit for the users, multimedia search has become an increasingly important research topic. Web scale multimedia search engines mostly use keyword as queries and depend on the surrounding text to search the multimedia. A multimedia search engine generally operates in two main steps: the offline index generation and the online index serving step. Meaningful and significant multimedia retrieval is a challenge for effective web search. By using existing technique uncertainty is occurred in multimedia retrieval. Sometimes accurately describing the visual content of target multimedia using keyword only is difficult for user. Due to lack of query and visual features multimedia obtained are less relevant as per user need.

To address the problems of visual search approaches, multimedia search re-ranking has received increasing attention in recent years. It is defined as the reordering of visual documents based on the information manifested in the initial search results or a knowledge base to improve the search performance. This information actually consists of multimodal cues that can be the knowledge or specific patterns mined from the initial ranked list, query examples, or any available auxiliary knowledge. From another perspective, re-ranking can be viewed as a post process of core search.

Re-ranking approach specially detect the user actions and utilized to improve the percentage of the retrieved relevant files. We believe that if a user did the actions on any of query files, called as Target, is related to the required ones:

Download the file., Copy the file or a part of the file., Spend more than a number of seconds (N) in checking the file, where N will be specified by the system administrator. Then, the Target file will be analyzed and the query results will be reordered depending on their similarity with the Target.

A multimedia search engine generally operates in two important steps: Offline operation and Online operation

Offline Operations

When a not existed file is added to the database, the file will be first preprocessed and extracted features from them before saved.

1) Pre-processing operations:
Preprocessing is used to remove unused parts of multimedia because multimedia files are most frequently captures and edited by doing so multimedia files becomes noisy. So quality of multimedia retrieval is affected.

a) Image files pre-processing operation
For removing noise preprocessing adopted linear, nonlinear like median filter, weighted median filter and fuzzy methods. linear filters may destroy image details, Fuzzy filters provide promising result and median filter found to be effective in storing image detail at reasonable cost

b) Video files pre-processing operation

Video structure contains numerous consecutive frames combined with the audio data. And it is found that videos consist some meaningless frames, like totally black, white, faded frames. This makes the process of selecting efficient features for representing video files difficult and time consuming. In this paper, static video summarization method used because it requires less time than dynamic method to filter and remove the irrelevant and redundant video frames.

c) Audio files pre-processing operation

Audio formats consist bit rate, sampling rate, and number of channels and that will indicate that two similar files are different. To solve this problem, the audio files will be decoded with Pulse Code Modulation format (PCM).

2) File FeaturesExtraction

Feature extraction from image, video and audio files is described:

a) Image feature extraction process

Scalable Color Descriptor (SCD), Edge Histogram Descriptor (EHD), and Joint Composite Descriptor (JCD) used to extract features from image media.

b) Video feature extraction process

For processing large database and decreasing cost of computational file fingerprinting is utilized.

c) Audio feature extraction process

Fingerprints of the audio files consist of following steps:

i] Building the spectrogram: After preprocessing the signal with 5512 Hz PCM, the audio spectrogram, which shows how the spectral density of a signal varies in time, will be constructed.

ii]Band filtering:

Generally human ears can recognize the frequencies in the range 20 Hz-2000 Hz. In this spectrogram is used to obtain the range which human eye can sense.

Online Operations

Here user behavior will be supervised. When the user download, copy, or spending more than a number of seconds (N) with a Target file, the results of query will be re-ranked by applying:

i] Distance between the Target file (T) and the other files (Y) by using the Euclidean formula are calculated.

ii] Assign a weight to every descriptor. This is based on the similarity of the descriptor vector of the Y and T files. In case of images and videos, the descriptor capability to differentiate between the files will be assigned a higher weight than the others, while the opposite is applied in the case of audios.

iii] Normalize and compute the rank of the file Y.

The section I explains the Introduction of multimedia re-ranking techniques. Section II presents the literature review of existing systems and Section III present proposed system Section IV presents experimental analysis of proposed system. Section V concludes our proposed system. While at the end list of references paper are presented.

II. LITERATURE REVIEW

Author proposes a new re-ranking scheme [1] and presents experimental performance results for web image retrieval with integrated query. Also they work on cross-modal association rule that was designed for associating one keyword with several visual feature clusters in web image retrieval. Based on the cross-modal association rule, author developed an automatic re-ranking process online to integrate the keyword and visual features for web image retrieval, and gives experimental test. The experiment is carried out in a web image retrieval system named VAST (VisuAl &SemanTic image search).

Here proposed a semi-supervised ranking aggregation method [2], in which the order of several item pairs are labeled as side information. The main thing is to learn a ranking function based on the ordering agreement of different rankers. The ranking scores assigned by this ranking function on the labeled data are consistent with the given pairwise order constraints while the ranking scores on the unlabeled data

Due to explosive growth of online content, automated search engine programs are used to search and categorize billions of webpages and show only the most relevant pages for the search query submitted by the user. Search enginesemploy combination of automated algorithms, manually edited directories and advertisements to generate results for user's queries. Author proposed augmented version of the standard PageRank algorithm [3] by using `weight' of in-linked web pages. Rather than evenly dividing the weight of an in-linked webpage, our technique distributes it to all the out linked pages on the basis of their popularity. Also invented enhanced page ranking algorithm as WIL (Weightage In-Link) PageRank algorithm. WIL uses the weights of in-linked webpages to calculate a new score of every individual webpage called WIL-score. Later the webpages can be ranked according to this WIL-score.

Goodrum and Spink [4] specifically analyzed users' image queries, terms and sessions using the same data used in our study. Twenty-eight (28) terms were used to identify queries for both still and moving images, resulting in a subset of 33,149 image queries by 9,855 users. They provide data on: (1) image queries – the number of search terms, and the use of visual modifiers, (2) image search sessions – the number of queries per user, modifications made to subsequent queries in a session, and (3) image terms – their rank/frequencydistribution and the most highly used search terms. Goodrum and Spink found a mean of 2.64 image queries per user containing a mean of 3.74 terms per query. Image queries contained a large number of unique terms. The most frequently occurring image related terms appeared less than 10% of the time, with most terms occurring only once. This can be contrasted to earlier work by Enser who examined written queries for pictorial informationin a non-digital environment.

In this paper a novel Ranking Preserving Hashing (RPH) approach [5] proposed to optimizes a popular ranking measure, Normalized Discounted Cumulative Gain(NDCG), to obtain effective hashing codes with high ranking accuracy. The main difficulty in the direct optimization of NDCG measure is that it depends on the ranking order of data examples, which forms a non-convex non-smooth optimization problem.

A real time image search engine is developed for online image search with re-ranking: The proposed Adaptive Similarity is motivated by the idea that a user always has a specific intention when submitting a query image. But it was hard for the eight weighting schemes to cover the large variety of all the web images. It was also likely for a query image to be classified to a wrong category [6].

Retrieval is based on the query-by-example paradigm: the user provides a query image, for which a semantic multinomial is computed and matched to those in the database. QBSE produces retrieval systems that are more accurate than what was previously possible [7]. Introduction to a Human Computer Interaction approach to CBIR based on relevance feedback. It is not like the computer centric approach where the user has to precisely decompose his information need into different feature re-presentations and precisely specify all the weights associated with them the proposed interactive approach allows the user to submit a coarse initial query and continuously refine his information need via relevance feedback. For web scale user's feedback has to be limited. This approach

greatly reduces the user's effort of composing a query and captures the user's information need more precisely[8].

Author proposed NeTra, which is a prototype image retrieval system. It utilizes color, shape, texture and spatial location information in fragmented image section for searching and extracts similar section from the database. The search based on object or region is permitted in this system and the quality of image retrieval is also improved when images include many complex objects [9].

Most of Pseudo-Relevance feedback techniques limit users' effort by extending query image with maximum visually similar images. R. Yan et al. introduced a concept to give user approximate images in just a one click. Semantic gap between query image and other visual inconsistent images results into poor performance. In this, top N images which mainly visually match with the query image are considered as extended positive examples for obtaining a resemblance metric. But the top N images are not essentially semantically related to the query image, thus the obtained resemblance metric may not always show the semantic relevance and may even deteriorate re-ranking performance [10].

In this paper author did classification of query images into eight pre-identified intention classes and different types of query images are given different feature weighs. But the huge variety of all the web images was difficult to cover up by the eight weighting schemes. In this, a query image was to be categorized to a wrong class [101].

Cai et al. recommended matching the images in semantic spaces and re-ranking them with attributes or reference classes which were manually defined and learned from training examples which were manually labeled. They supposed that there was one main semantic class for a query keyword. Re-ranking of images is done by using this main category with visual and textual features. Still it is tough and inefficient to learn a universal visual semantic space to express highly varied images from the web [12].

III. SYSTEM ARCHITECTURE

Here in Fig.1 Multimedia (Image, Audio and Video) dataset is taken as an input after that preprocessing is applied on that to extract features. Among the extracted features essential features are selected for further processing after that similarity between user query and dataset files is calculated using algorithm and to improve result accuracy re-ranking of targeted output is performed.

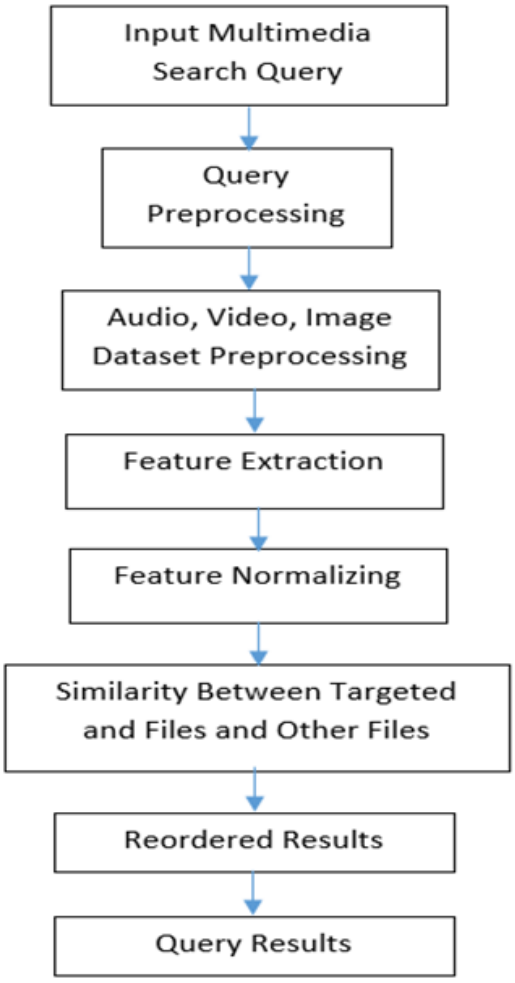

Fig 1. System Architecture

IV. RESULT AND DISCUSSIONS

A. Experimental Setup

All the experimental cases are implemented in Java in congestion with Netbeans tools, algorithms and strategies, and the various audio, video, image feature extraction techniques, and run in environment with System having configuration of Intel Core i5-6200U, 2.30 GHz Windows 10 (64 bit) machine with 8GB of RAM.

V. CONCLUSION

Here we discussed how re-ranking techniques used in multimedia search engine like video, image and audio. The proposed re-ranking system gives better results of web-scale multimedia re-ranking than the existing system and also considerably gets better in both the accuracy and efficiency of the re-ranking method. Multimedia search re-ranking is utilized to reorder retrieved elements to get optimal rank list. Re-ranking used to acquire the accurate query result.

VI. REFERENCES

[1]. Zhu, Y., Xiong, N., Park, J., and He, R., "A Web Image Retrieval Reranking Scheme with Cross-Modal Association Rules", InternationalSymposium on Ubiquitous Multimedia Computing, Issue 13, Pages 83 - 86, 2008.

[2]. Chen, S., Wang, F., Song, Y., and Zhang, C., "Semi-supervised ranking aggregation", Information Processing & Management, Volume 47, Issue 3, Pages 415-425, 2011.

[3]. Singhal, R., & Srivastava, S. R. , "Enhancing the page ranking for search engine optimization based on weightage of in-linked web pages." Recent Advances and Innovations in Engineering (ICRAIE), 2016 International Conference on. IEEE, 2016.

[4]. Goodrum, A. and A. Spink (1999), "Visual Information Seeking: A Study of Image Queries on the World Wide Web," In Proceedings the 1999 Annual Meeting of the American Society for Information Science, Washington, DC, November 1999, pp. 665–674

[5]. Lu, M., Huang, Y., Xie, M., and Liu, J., "Rank hash similarity for fast similarity search", Information Processing & Management, Volume 49,Issue 1, Pages 158-168,2013.

[6]. J.Cui, F. Wen, et.al, "Real time Google and live image search reranking", The 16th ACM international conference on Multimedia, Pages 729-732, 2008.

[7]. X. Tang, K.Liu, J. Cui, et.a, "IntentSearch: Capturing User Intention for One-Click Internet Image Search", IEEE Transactions On Pattern Analysis and Machine Intelligence Vol. 34, No.7 pages 1342 – 1353, July 2012.

[8]. Y. Rui, T. S. Huang, M. Ortega, et.al, "Relevance feedback: a power tool for interactive Content-based image retrieval", IEEE Transactions On Circuits and Systems for Video Technology, 1998.

[9]. W. Y. Ma and B. S. Manjunath, "A toolbox for navigating large image databases, multimedia system," 3(7), 1999, 184-198.

[10]. R. Yan, E. Hauptmann, and R. Jin, "Multimedia Search with Pseudo-Relevance Feedback," in Proc. Int. Conf. Image and Video Retrieval, 2003.

[11]. J. Cui, F. Wen, and X. Tang, "Real Time Google and Live Image Search Re-Ranking," in Proc. 16th ACM Int. Conf. Multimedia, 2008.

[12]. J. Cai, Z. Zha, W. Zhou, and Q. Tian, "Attribute-Assisted Reranking for Web Image Retrieval," in Proc. 20th ACM Int. Conf. Multimedia, 2012.

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