Image Retrieval using Hash Code and Relevance Feedback Technique

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ABSTRACT

Scalable image search based on similarity matching has been an active topic in recent years. Currently use of web has been increased significantly for information recovery and it is challenging to extract the relevance information in less time. Sometime Search engine does not able to recognize user search aim behind query. For this the State-of-the-art systems usually use hashing approaches to embed high-dimensional image features into given Hamming space, where result search may be executed in real time based on Hamming distance of compact binary hash codes. There are various methods based on account of query adaptive method to recover the image searching. But these methods fail to satisfy user's requirement. Therefore in addition of the query adaptive method with relevance feedback can produce better results. Relevance feedback is the method of automatically changing the current query with the information feedback by the user about the relevance of previously recovered images. Analysis on a Flickr image dataset and relevance feedback for given output illustrates perfect improvements from our projected approach.

Keywords

Query-adaptive image search, scalability, hash codes, weighted Hamming distance, relevance feedback.

1. INTRODUCTION

Images perform an essential role in several fields such as art gallery, medical, journalism and entertainment. Collectively uses of image gaining and data storing technologies are allowed to the design of large database. So, it is essential to improve applicable information management system to capably achieve these groups and needed a system to retrieve necessary images from these collections. Due to explosive development of optical content on the Web, such as photographs and images, there is a developing need of searching visually appropriate images from very large databases. Nowadays the development of internet is improved with growth of size and popularity and the association of large scale capacities of web data, thus it is difficult to remove the relevance information that have been used in wide range of application. Many beginner users faces the difficulty to get the required information although they use most efficient marketable Search engines like Bing, Google, Yahoo, MSN and so on provides various remunerations to the customers. It consists of information search in the form of text and pictorial features format. The search engines create the effective equivalent outcomes in output whatever the users specified as system. In existing system it find hash code, Hamming distance, and query adaptive weight, also to get better result givesfiner grained ranking. But it is found that some irrelevant images also search in that result.

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inputs in the form of text information, images or visual features. In Big Web scale image survey devices usually user

use keywords or queries as the input and depend on instant content to search images. And this web image search undergo from the indecision of users query keywords, for the reason that it is hard for users to approximately express the visual satisfied of target images only using queries or text. Usually a significant image search method consists of some key components i.e. an active image feature design and an effective search device. For effective image searching query adaptive image search is used. In this work it inclines to signify images using the popular bag-of-visual-words (BoW) structure, where local invariant image descriptors such as SIFT are used for extracted and quantized mainly constructed on a set of optical words. The BoW features are then embedded into compact binary hash codes for effective search result. For this, it consists of some advanced techniques such as semi-supervised hashing and semantic hashing with deep belief networks. Hashing is required above tree based indexing structures (e.g. Kd-tree) also works as improved for high-dimensional samples. With the hash codes, image similarity is competently measured with the help of logical XOR operations in Hamming space by Hamming distance, an integer value achieved by including the amount of bits at that the binary values are dissimilar. In huge scale applicationsthe dimension of Hamming space is normally set as a small amount e.g., less than a hundred to cut back memory cost and avoidlowrecall[1]. As a result, hundreds or May thousands of images may share identical ranking in search result list, however are not possible to be equivalently relevance to the query. Although one can exhaustively compute the similarity for such candidate images to get exact ranking, it can significantly increase both computational price and memory needs. The query-adaptive bitwise weights should be calculated in real-time. To this end, it connects to a group of semantic conception classes that protect several semantic aspects of image content such as scenes and objects. Bitwise weights for each of the semantic classes are learned offline paying a unique construction that not just exploits intra-class sample similarities also preserves inter-class relationships.Now, weighted Hamming distance is useful to calculate matches among the query and images in a target database. It name this weighted distance as query adaptive Hamming distance, as against the query different Hamming distance varied working in existing work. This technique is work for image searching with the help of hash code system; still there drawbacks in existing are some

In order to solve all these problems and give improved results, as mentioned query which can satisfy users' image searching need and improve the quality of image searching, we must have to understand the way to express the users' information need. For better reference the query must be formulate properly and well organized manner with more exact meaning. For improved image searching we used relevance feedback technique. With this method we will take feedback from user, and user will decide that which image is relevance or irrelevant with query image. With the help of this technique user will search the query and also give feedback for the same.The rest of the paper is ordered as follows. Section 2 gives literature survey on work done in query adaptive technique and section 3 explains the motivation relevance feedback method; then section 4 gives the working of Query adaptive ranking method with relevance feedback method; section 5 describes experimental setup for Query adaptive ranking method with relevance feedback method. Finally conclusion and the future work are explained in section 6.

2. LITERATURE SURVEY

As queries are one of the most important boundaries for users to access the information over web, also it moves the performance of search engines. There are various techniques that are recently developed in order to classify the query adaptive image search. These techniques provide guidelines for improving the existing technique for finding more appropriate learning technique. The popular bag-of-visualwords (BoW) are based on memory procedure per image. Herve Jegou et al. proposed BoW reduces memory usage by more than one order of amount also providing excellent search quality. In BoW they used SIFT descriptors and their geometry information in which they consist of the location, orientation, and size of the image patch from which the descriptor was extracted. For each descriptor, their method retrieves the nearest local invariant image descriptor in a large-scale image database using nearest neighbor search [2].

Wei Liu *et al.* proposed a scalable graph-based unsupervised hashing approach which respects the fundamental diverse structure of the data back to nearest neighbors Their Experimental results shows important presentation gain the state of the art hashing methods in retrieving semantically related neighbors [3]. There are various hashing methods which can be used in image searching for improved results. The most presented techniques are supervised and unsupervised; along with this the Locality Sensitive Hashing (LSH) improves online selection of pool hash function. In this way the accuracy of the search is improved.

Herve Jegouet al. projected enhanced LSH by the stage of online selection of the hash functions from a pool of functions. A performance based on state of the art high-dimensional descriptors compute on real images shows improvements on LSH to decrease the search complexity for a given level of accuracy. Motivated by this Y. Weiss *et al.*, proposed a spectral hashing (SH) method, in this input space based depends on data distribution for hashing. Spectral hashing is used to discover a finest code for a certain dataset which is associated with the graph. In Locality Sensitive Hashing (LSH) is a most prominent method, this engender each hash bit typically by projecting the data points to an arbitrary hyper plane and then conducting arbitrary threshold. Spectral hashing ascertains that the projections are orthogonal and sample number is balanced across different buckets. All these methods are used to search approximate nearest neighbor search [6]. There are specified hashing methods such as unsupervised and supervised. The unsupervised hashing method shows better results than the supervised hashing. H. Jegou et al., proposed the unsupervised hashing gives performance in the form of labeled pairs of images. The supervised hashing method consists of the most popular methods such LSH, and Spectral hashing, having a great

effect on supervised hashing. Unsupervised hashing performs labeled pair of images, where semi supervised hashing is used to minimize the error on the labeled data and images. With all this methods it generates hash code and ranked image but this approach fails to prove to finding its effectiveness in related queries[7].Yuanhua Lv. et al. developed that Relevance feedback has established very effective for improving retrieval correctness. A challenging though significant difficulty in all relevance feedback methods is how to optimally balance the original query and feedback information. In the recent feedback methods, the equilibrium constraint is usually set to a fixed significance through all the queries and collections. However, due to the inconsistency in queries and feedback documents, this balance constraint should be enhanced for each query and each set of feedback documents [8].Deok Hwan Kim et al., demonstrated a novel content-based image retrieval method with adaptive classification and cluster merging to discover various clusters of a compound image query. The relevance feedback is a spontaneous purifying method of the present query to demonstrations based on low-level features with the user's appraisal of the relevance of images retrieved by query processing. When the organism presents a set of images measured to be related to a given query, the user can give preference that which one is the most relevance to the particular query and the system refines the query using them. For this they introduced the incorporated quadratic forms for the distance function, the adaptive classifier, and the clustermerging measure [9].

Ben He *et al.* presented the query adaptive reweighting method with finer grained ranking in image search. This method shows the appropriate evidence for the query images such as text, links etc. then queries can be reweighting and finer grained ranked by the system. For this Ben He et al. suggest that the performance of reweighting and finer grained ranking on first pass retrieval [10].T. S. Chua *et al.* worked on the semantic concept classes which most widely used NUSWIDE dataset. This technique consists of scenes and objects, here NUSWIDE consist of flicker images, training set images and test set images. The concepts in NUSWIDE are extremely appropriate for constructing the semantic database. Hence NUSWIDE is suitable for all databases [11].

3. MOTIVATION

Query adaptive method try to suggest related query image searching with hash code technique. Also finds Hamming distance and Query adaptive weights with finer grained ranking. But these methods do not consider recent user search intent accurately; also it is found that some irrelevant images also search in that result. In addition with query adaptive method the relevance feedback as an active solution to improve performance of image similarity search. However, few approaches using the relevance feedback are presently available to achieve relatively complex queries on large image databases.

4. QUERY ADAPTIVE RANKING WITH RELEVANCE FEEDBACK

Query adaptive ranking method is focus on the assumption that user's image search needs are described more specifically in query adaptive ranking. In this method user select query image then generate hash code and extract features with SIFT feature extractor. After this it finds weight of the query image and search the result with the Hamming distance to get finer grained ranking. User search the query with this method but the result shows both relevance and irrelevant image information. According to this assumption user found irrelevant images, because of this the accuracy of result is decrease. The important challenge in the query adaptive image search is to shows exact output of given query image but it is not predict exact output based on the user queries. To overcome this problem and search image from large scale dataset we used relevance feedback method. The system framework is as shown in figure 1.



Figure 1. System framework of image retrieval using hash code and relevance feedback.

The system frame work of query adaptive ranking with relevance feedback indicates that, when the system presents a large set of images are considered to be similar to a given query image, the user can select ones most nearest and relevance to the given input query, after this process user can give the feedback to system i.e. the irrelevant image is removed from the system and shows the relevance images as expected output. The main advantage of relevance feedback is, it is especially helpful in some application where user wants long lasting information.

4.1 IMAGE RETRIEVAL USING RELEVANCE FEEDBACK

In this paper we used relevance feedback technique to improved image searching and provide better service for user. From the exiting method we used our first algorithm i.e. image searching with query adaptive image search where hash codes are generate and search images with calculated Hamming distance. In second algorithm it finds weights match the similar images with query image. In third algorithm we used relevance feedback method in which user gives the feedback to system about the performance of our system.

Algorithm1: Image filtering with query adaptive image search [1]

- Select set of training images of predefined categories.
- Store category images and their generated hash codes in database images for category index.
- Determine category image with stored image having nearest Hamming distance for query image.
- Candidate images of query images are selected for further similarity matching.

Algorithm 2: Similarity Fusion query adaptive weights [1]

- Store category specific feature weights for similarity matching.
- · Calculate individual feature vector for query image.
- For each hash code and weight get category prediction depending on probabilistic output.
- · Get final category of query image.
- · Consider the individual feature weight for query image.
- Combine the similarity score in linear combination with feature weight.
- Return top ranked images in descending order of similarity matching score.

Algorithm 3: Proposed technique i.e. Relevance Feedback based on similarity fusion

- **Step I:** Initially consider top ranked images based on similarity fusion on an equal feature weighting.
- In this step we already search images using query adaptive ranking method with weight and ranking.
- **Step II:** Obtain the users feedback about relevance images from top images.
- In this step we get output of query image and found some irrelevant images.
- Step III: Compute new query image with relevance images.
- In this we check result with our query image and match all result with input image.
- **Step IV:** Measure effectiveness for each ranked list based on similarity matching.

In this step it measure efficiency of all ranked or output images with input image and gives feedback to system i.e. some images are irrelevant, also user gives feedback until get relevant images.

Step V: Normalize the effectiveness.

In this step we found all related images with query image.

Step VI: Consider normalize score as updated weights and give feedback.

Finally user get correct and relevant images related with query Present methods to CBIR adopt that relevant images are actually near the query image in some feature space irrespective of visual features. However, the similarity between images supposed by humans does not essentially associate with the distance between them in the feature space. CBIR uses visual features to calculate image similarity. Some local image features such as SIFT used for extracting distinctive invariant features form visual information retrieval Images that can be used to perform suitable matching between different views of an objector scene. In relevance feedback application we use above concept.

5. EXPERIMENTS AND RESULTS

For the performance evaluation of query adaptive ranking and relevance feedback system, the system is run on configuration having Windows 7 with 4GB RAM. This method is implemented with java. For this system java works on front end and MySQL on back end. MySQL is used to store all hash code which we generate in training phase. For this the Net Beans IDE 8.0 is used, which contains the Java development tool. For this system we used 100 categories for image search which are stored in database. Here we used widely adopted NUS-WIDE dataset [11]. NUS-WIDE contains many Flickr images, which are divided into a training set and a test set. It is fully labeled with 100 semantic concept classes, covering many topics from objects (e.g., Animals and Car) to scenes (e.g., Hills and Harbor). Remember that NUS-WIDE is one of the biggest widely available accessible datasets with complete labels of a wide range of classes.

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Table 2. Result for Relevance Feedback Method

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For performance measurement, we rank all images in the NUS-WIDE dataset according to their weighted Hamming distances to each query and result will be search. After this process the users give the feedback to given output query image. Table I describes the result of Query adaptive ranking

method in which images are search on the basis of hash code technique. In first table result given value of actual image search by system and in accurate result the value of actual relevance images search by user also represent in percentages. Table II describes the result of relevance feedback method in which user give feedback and decides that which images are relevance or irrelevant with give query image. In second table result shows the accuracy of image search using relevance feedback method. On the basis of these tables we show our result using graph as shown below.



Figure 2. Result of Query adaptive ranking method and Relevance feedback application

6. CONCLUSIONSAND FUTUREWORK

Generally many query recommendation techniques try to use the previous query images which are similar in any way with current query. In this paper, we have improved image searching using different hashing techniques which consist of the performance of query images related with quality of the top-ranked images and the quality of the weight of the query image. But this method wants to know exactly user's information need. In order to improve the performance the image search we used relevance feedback method. The query adaptive relevance feedback method is to improve the balance between query and feedback information. In this method, user gives the feedback to system and removes the irrelevant image information.

In future, we hope to extend this approach to make use of correctly identified intent for query image to improve the performance of image searching. Also this work can be further improved by use of client server architecture for multiple users.

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