ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 5, Issue 1, July 2015

Approaches for User Image Search Goals Using Grouping Similarity

Reena Rachagiri, D. Baswaraj, Dr. M Janga Reddy
PG Student, CSE Dept., CMR Institute of Technology, Hyderabad
Associate Professor, CSE Dept., CMR Institute of Technology, Hyderabad
Principal and Professor, CSE Dept., CMR Institute of Technology, Hyderabad

Abstract - Image retrieval and re-ranking as per user image query has become the popular and effective of image retrieval techniques. Similar user query and click through log is important for the success of an image search engine. User search goal analysis will also enhance user experience of a search engine. Using this as a base and leveraging click logs we propose a new design in this paper. In this paper, we focus on designing a new machine learning approach for auto classification and grouping similar user queries for image search system to address a specific kind of image search. Our approach finds most relevant images for a user based on a given user query. Here, our focus is to evaluate the effective association between User Queries and Click through data and customizes search results according to each individual preferences/interests. We also present a ranking procedure to score the images that are retrieved using the proposed approach.

I. INTRODUCTION

The image retrieval is the process of retrieving images with respect to user intention from the large amount of databases. The user first enters query, based on the keywords in the query the search is performed and from the pool of images resulting images are displayed to the user. Initial image search is performed using surrounding text information of the image. The surrounding text information includes filename, caption or description of the image. e.g. If user wants to search an image of animal tiger and enters query as "tiger" then images containing text "tiger" into their surrounding information are displayed. If any image contains text "tiger" into their surrounding text but it is irrelevant to user intention then this image is also displayed. e.g. image of a person having caption "tiger" is also displayed. The performance of the search decreases because of ambiguous surrounding information [8].To improve the performance of search engine new methods are developed which includes Keyword Expansion, Query Difficulty Prediction, Co-click history, Active-Reranking, Prototype Based Image Search Re-ranking .

II. LITERATURE SURVEY

As like a traditional method the image search is performed using text keywords in the query. If the keywords in the query appear in the surrounding text of the image then that image is retrieved as a resulting image. There is some work related with textual information is going on which uses text including filename of the image, URL of the image and description or the caption of the image as a surrounding text parameter. If the text is found in these surrounding parameters of the image then that image is displayed as a result image. The textual search is used as a input for visual similarity based search by grouping the images which is having same textual tag. But some difficulty with textual search is that if the external text is ambiguous or not related with the image then this becomes a limitation for textual search [2]. Extraction of visual content from images is split into two parts, namely image processing and feature construction. The features extracted are color, texture, and shape. When users search for pictures, their intent or clarity about what they desire may vary. The clarity of intent plays a key role in a user's expectation from a search system and the nature of her interaction. It can also act as a guideline for system design [3]. A user once find candidate image of target image the re-ranking function is used by choosing that candidate image as a query image. One of the approach described by xiao gang and xiaoou Tang which has offline and online parts [4]. To refine an image search "logs" of search engine are used. These logs are used as a relevance feedback signals to refine image distance function. This approach is similar to soft margin SVM trained with relative comparison of the images [5]. When user enters query for image search the resulting images are displayed by extracting surrounding information of the image. But if user query is not sufficient to express the intention of the user because of lack of knowledge about giving specific word for image search then the search performance also decreases [6]. To make prediction correctly about the user's query image intention the sample selection strategy is used to decrease the clients labeling efforts To display result of correct images to the user "active re-ranking" is used. In this method the user intention is captured and used for re-ranking the images. To improve the performance of search, labeling information is collected from user and new method is proposed to actively select more informative query images through structural information [7]. Strategies used for image search re-ranking can be divided into two types i.e. supervised and unsupervised. The unsupervised method is not depending upon user labeling. Author proposed prototype based re-ranking method. This method constructs meta re-rankers with respect to visual prototypes presenting the textual query

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 5, Issue 1, July 2015

and design the weights of linear model to group the result of individual metarankers and produce the re-ranking score of a given image taken from the initial text based search result[8]. The method query difficulty prediction used to predict the quality of results generated by search without user's feedback and judgment. Query difficulty Prediction is easy in text search because query and document both are in textual format whereas in image search query is text and images are visual. This proposed method automatically predicts the query difficulty for any query through machine learning approach [9]. For large scale images and indexing the bag of words (BOW) model has been known. In BOW search process depends on voting process. i.e. if image text describes the actual content of image. The voting score exactly reflect the image similarity. In multimedia search area the bag of word model becomes very popular because of its simplicity and effectiveness [10].

III. RELATED WORK AND EXISTING SYSTEM

Since last some years, the research on text based image search has been increased, but in fact, their works belong to query classification. Some works analyze the search results returned by the search engine directly to show different query aspects [6], [20]. However, query aspects without ranking procedure have limitations to improve search engine relevance. Some works take user feedback into account and analyze the different clicked URLs of a query in user click-through logs directly; nevertheless the number of different clicked URLs of a query may be not big enough to get ideal results The above mentioned Image search engines provide an effortless route, but currently are limited by poor precision of the returned images and also restrictions on the total number of Images provided. While several studies reveal general characteristics of image searching based on transaction log data, little has been investigated concerning whether or not image searching behavior, especially querying behavior – query iterations and query length – differs based on a user's contextual aspects and different sources of collections on Web search engines. The existing methods for image searching and ranking suffer from the unreliability of the assumptions under which the initial text based image search results. However, producing such results containing a large number of images gives more number of irrelevant images. The existing methods for image searching and re-ranking suffer from the unreliability of the assumptions under which the initial text-based image search result. However, producing such results contains a large number of images and with more number of irrelevant images.

A. Text Based Image Retrieval

This one is very popular framework of image retrieval then was to first annotate the images by text and then use text based database management systems (DBMS) to perform image retrieval. Many advances, such as data modeling, multidimensional indexing, and query evaluation, have been made along this research direction. There are two disadvantages to use this image retrieval system, especially when the size of image collections is large (tens or hundreds of thousands). One is the vast amount of labor required in manual image annotation. The other difficulty, which is more essential, results from the rich content in the images and the subjectivity of human perception. That is, for the same image content different people may perceive it differently. The perception subjectivity and annotation impreciseness may cause unrecoverable mismatches in later retrieval processes.

B. Content Based Image Retrieval

The emergence of large-scale image collections, the two difficulties faced by the manual annotation approach became more and more acute. To overcome these difficulties, content-based image retrieval (CBIR) was proposed. That is, instead of being manually annotated by text-based key words, images would be indexed by their own visual content, such as color and texture. Since then, many techniques in this research direction have been developed and many image retrieval systems, both research and commercial, have been built. The advances in this research direction are mainly contributed by the computer vision community. Text Based Image Retrieval led to two disadvantages. First one is that a considerable level of human labor is required for manual annotation. The second is the annotation inaccuracy due to the subjectivity of human perception. The current CBIR systems suffer from the semantic gap. Though a user feedback is suggested as a remedy to this problem, it often leads to distraction in the search. To overcome these disadvantages we propose a novel interactive image retrieval system, to enhance the image retrieval accuracy as per the user expectation.

IV. BACKGROUND

We propose to leverage click session info, that indicates high correlations among the clicked pictures in a very session in user click-through logs, and mix it with the clicked images' visual info for inferring user image-search goals. The click session info will function past users' implicit guidance for cluster the photo graphs; a lot of precise user search goals may be obtained.

A. Image Classification

Image classification is the process of grouping of similar types of image into a single unit i.e. called cluster of image. Content-based image classification is aimed at efficient classification of relevant images from large image databases based on automatically derived imagery features. These imagery features are typically extracted from shape, texture, color properties of query image and

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 5, Issue 1, July 2015

images in the database. Potential application includes digital libraries, commerce, Web searching, biomedicine, surveillance, geographic information systems and sensor systems, education, commerce, crime prevention, etc.

B. Grouping Similar User Query

Grouping Query is a process used to discover frequently asked questions or most popular topics on a search engine. Despite the fact that keywords are not always good descriptors of contents, most existing search engines still rely solely on the keywords contained in documents and queries to calculate their similarity. This is one of the main factors that affect the precision of the search engines. In many cases, the answers returned by search engines are not relevant to the user's information need, although they do contain the same keywords as the query.

The queries submitted by users are very different, however, and they are not always well-formed questions. In order to group queries, two related problems have to be solved: (1) How can human editors determine which questions/ queries are frequently raised by users? (2) How can a system judge if two questions/queries are similar?

The classic approach to information retrieval (IR) would suggest a similarity calculation between queries according to their keywords. However, this approach has some known drawbacks due to the limitations of keywords. In the case of queries, in particular, the keyword-based similarity calculation will be very inaccurate (with respect to semantic similarity) due to the short lengths of the queries.

C. Click through Data

Inferring user search goals is very important in improving search engine relevance and user experience. Normally, the captured user image-search goals can be utilized in many applications. For example, we can take user image search goals as visual query suggestions to help users reformulate their queries during image search. Besides, we can also categorize search results for image search according to the inferred user image-search goals to make it easier for users to browse. Furthermore, we can also diversify and re-rank the results retrieved for a query in image search with the discovered user image-search goals. Thus, inferring user image-search goals is one of the key techniques in improving users' search experience.

The click-through information from the past users can provide good guidance about the semantic correlation among images. By mining the user click-through logs, we can obtain two kinds of information: the click content information i.e., the visual information of the clicked images and the click session information i.e., the correlation information among the images in a session. Commonly, a session in user click-through logs is a sequence of queries and a series of clicks by the user toward addressing a single information need. Whereas a query logs are auto saved as data of user activities on search engines servers. It consists of user identity attributes as Session ID, IP address, Timestamp, Query string, Number of results on results page and Results page number. A relevance click through data also saved consisting of clicked URL, associated query, position on results page and Time-stamp attributes in the log. The application used in client side can be modified to handle the query and clickthrough usage logs in the user side computer. Clickthrough data in search engines can be thought of as triplets (q, r, c) consisting of the query q, the ranking r presented to the user, and the set c of links the user clicked on. Since every query corresponds to one triplet, the amount of data that is potentially available is virtually unlimited. Clickthrough data can be recorded with little overhead and without compromising the functionality and usefulness of the search engine. In particular, compared to explicit user feedback, it does not add any overhead for the user. The query q and the returned ranking r can easily be recorded whenever the resulting ranking is displayed to the user. For recording the clicks, a simple proxy system can keep a log file. Usually, the clicked images in a session have high correlations. This correlation information provides hints on which images belong to the same search goal from the viewpoint of image semantics.

V. PROPOSED SYSTEM

A. System Architecture

Figure 1 shows the steps involved in the interaction of the user with the system. It includes total of 10 steps which gives refined results of web image search.

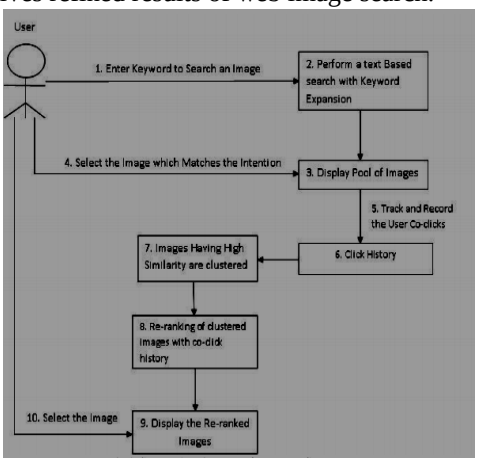

Fig. .1 System Architecture of proposed System

System Modules

The proposed work includes following modules:

B. Keyword Expansion

To search an image, the user has to first enter a keyword and the entered keyword matching with already searched log history is suggested for expansion. The history also maintains the semantics of every keyword to make a search faster. The similar keyword having more semantic is displayed first. User can select query keyword from the suggested list or user can enter new keyword.

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 5, Issue 1, July 2015

C. Image Search with Query Keyword

Based on the keyword entered by user the images are first searched from the database including their Meta information. The meta-information is either file information, file name or any text included to describe an image. If the text matching with the entered keyword found in surrounding information of images then that images are retrieved as a result images. After retrieving the images based on the keyword user have to select one of the images for refining the image search. This refinement is done by comparing selected image with other images.

D. Image Comparison based on clicked image

After viewing pool of images, user clicks on one of the image which is mostly perfect image as he wants. That image is compared with the images in database. Using the comparison algorithm the images are compared. The images having accuracy ratio greater than or equal to specify minimum accuracy are clustered and displayed. Following is the basic algorithm for image comparison.

Algorithm for image comparison

1. Initialize pointX to image height and i to 0
2. Initialize pointY to image width and n to 0
3. Repeat step 4 while i<=pointy
4. Repeat step while n<=pointX
   i) Compare search_image with n_image
   ii) if (rgb[search_image]==rgb[n_image]) then increment matchcount
5. Return matchcount (100/pointX*pointY)
6. if (Visual_Similarity>=accuracy_ratio) then show image.

E. Finding Co-Clicked Ratio

Recording image click history of user clicks it is easy to find out co-relation between the images. In a single image search if image Qi and Qj are both clicked by the user then they are said as co-clicked. Two images that are co-clicked frequently are more similar to each other than to third image that is co-clicked less often. Images with given query results are Re-ranked according their co-click history. By maintaining past history of co-clicks is also helpful for faster results.

F. Re-ranking Based on Accuracy

The cluster of images resulted in 5.2.4 which is highly related with query image are fine tuned by checking the result of pattern matching the images having high visual similarities assigned higher priority. All the images in the cluster are Re-ranked based on their visual similarity and co-click activities and then the result is displayed to the user.

VI. MATHEMATICAL MODEL FOR PROPOSED SYSTEM

Following is the mathematical model for proposed work. Let SE be the System SE = {I,Cc,Ar,O} where, I=Set of input{Qk, Qi} Qk=Query Keyword Qi=Query image Cc=Co-click Count Relative Comparison for Cc is: Qj and Qk= other images clicked in session with respect to Qi.

Rs=S(I) where,
each I ε S(Q) having Ar(I) ≥ min_Ar
S(I) = Set of Images based on visual similarities
S(Q) =Set of images
Ar = Accuracy Ratio
mn_Ar = Minimum Accuracy Ratio
The Output O is as follows:
$O=\sum\delta(Qi,Qj,Qk)+Rs$

$$\delta'(Qi, Qj, Qk) = \begin{cases} Qi, & \text{if } Cc(Qi, Qj) > Cc(Qi, Qk) \\ & S(Qk) < S(Qj) \\ Qk, & \text{if } Cc(Qi, Qj) < Cc(Qi, Qk) \\ & S(Qj) < S(Qk) \\ \emptyset, & \text{Otherwise} \end{cases}$$

VII. CONCLUSION

To remove unreliability and to increase the performance of web search engine multiple methods are applied. In this proposed work Image re-ranking is based on similarities between query image and the group of images. By observing click session information of user, which indicates visual similarities among the query images and group of images are compared. Images having high similarities with query image are retrieved. The search is refined based on visual similarities of the images. So the generated results are more efficient. By using keyword expansion most relevant images with query image are found. Co-click session derived from text based search engine query logs provides fastest results for similarity based search. Overall performance of the search engine is improved using visual similarities between query image and pool of the images.

VIII. ACKNOWLEDGEMENT

We thanks to all the authors and researchers referred in this paper for referring the important and useful information in order to carry out the project work.

REFERENCES

[1] Yushi Jing, Michele Covell, David Tsai, and James M. Rehg, Member, IEEE, Learning Query-Specific Distance Functions for Large-Scale Web Image Search, IEEE Transactions on Multimedia, Vol. 15, No. 8, December 2013.

[2] Zheng Lu, Xiaokang Yang, Senior Member, IEEE, Weiyao Lin, Hongyuan Zha, and Xiaolin Chen, Inferring User. Image Search Goals under the Implicit Guidance of Users, IEEE Transactions on Circuits and Systems for Video Technology, Vol. 24, NO. 3 MARCH 2014.

ISSN: 2277-3754
ISO 9001:2008 Certified
International Journal of Engineering and Innovative Technology (IJEIT)
Volume 5, Issue 1, July 2015

[3] R.Datta, D.Joshi, J.Li, andJ.Z.Wang, ‘‘Image retrieval: Ideas, influences, and trends of the new age’’, ACM Comput. Surveys, vol. 40, no. 2, pp. 1–5, 2008.

[4] Wang, Member, IEEE , Shi Qiu, Ke Liu, and Xiaoou Tang, Fellow, IEEE, Web Image Re-Ranking, Using Query-Specific Semantic Signatures, IEEE Transactions On Pattern Analysis And Machine Intelligence, Vol. 36, No. 4, April 2014.

[5] Yogdong Zhang, Senior Member, IEEE, Xiaopeng Yang, and Tao Mei, Senior Member, IEEE, Image Search Re-ranking with Query-dependent Click-based Relevance Feedback, IEEE TRANSACTIONS ON IMAGE PROCESSING, 1057-7149 (c) 2013 IEEE.

[6] Xiaoou Tang, Fellow, IEEE, Ke Liu, Jingyu Cui, Student Member, IEEE, Fang Wen, Member, IEEE, and xiaogang Wang, Member, IEEE, Intent Search: Capturing User Intention for One-Click Internet Image Search , IEEE Transactions On Pattern Analysis And Machine Intelligence, Vol. 34, NO. 7, JULY 2012.

[7] Xinmei Tian, Dacheng Tao, Member, IEEE, Xian-Sheng Hua, Member, IEEE, and Xiuqing Wu, Active Reranking For Web Image Search, IEEE Transactions On Image Processing, Vol. 19, No. 3, March 2010.

[8] Linjun Yang, Member, IEEE, and Alan Hanjalic, Senior Member, IEEE, Prototype-Based Image Search Reranking , IEEE Transactions On Multimedia, Vol. 14, No. 3, June 2012 871.

[9] Xinmei Tian, Yijuan Lu, Member, IEEE, and Linjun Yang, Member, IEEE , Query Difficulty Prediction for Web Image Search, Transactions On Multimedia,Vol. 14,NO. 4, 2012 951.

[10] Shikui Wei, Dong Xu, Xuelong Li, Fellow, IEEE, and Yao Zhao, Senior Member, IEEE, “Joint Optimization. Toward Effective and Efficient Image Search” IEEE Transactions On Cybernetics, Vol. 43, No. 6 December 2013.