ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 2, Issue 10, October 2014

A Survey of Web Image Search and Re-Ranking Technique

B. Steffi Graph[1], M. Ramesh[2]

[1]PG Scholar, Dept. of CSE, Kalaignar Karunanidhi institute of Technology, Coimbatore, India

[2] Assistant Professor, Dept of CSE, Kalaignar Karunanidhi institute of Technology, Coimbatore, India

ABSTRACT: Web-scale image search engines often uses keywords as queries and also depends on neighbouring text to search images. These search engines entails difficulty due to the ambiguity of query keywords, since it is hard for users to correctly depict the visual content of target images by only using keywords. Image re-ranking is an efficient way to advance the results of web-based image search, has been implemented by commercial search engines such as Google and Bing. A main challenge in the research of image re-ranking is that the similarities of visual features do not well associate with semantic meanings of images which infer users' search goal. This paper surveys various methods which developed recently used for image re-ranking techniques for different queries. Each method is differentiated with other surveyed method and comparative measures of methods are presented which provides the significance and limitations of web image re-ranking techniques with correspond to query specific semantic signatures.

KEYWORDS: image search engine, keyword, image re-ranking, semantic signatures

I. INTRODUCTION

The image ranking as an efficient technique to improve the results of Web based image search has been implemented by existing industrial search engines. For a given query keyword, search engine re-ranks the group of images based on the query. By prompting the user to pick a particular image from the group, the rest of the images are re-ranked based on the user selected image.

Web-image search is a widely growing feature of familiar search engines namely `Google', `Yahoo', `Bing', etc. For a given text query, the search engine has to search for millions of images for retrieving the relevant images as soon as possible. Generally the search engines are mainly based on the using text meta-data namely keywords, tags, and/or text descriptions close to the images. As the meta-data do not constantly be in associate to the visual term of the images, the retrieval of images is typically grouped with undesirable non-relevant images. Still, it has been examined that the retrieved images encloses sufficient relevant images which they are prepared for users that are in common more noticed by precision than recall. Then the precision can be enhanced by re-ranking the original set of retrieved images. Recently users efforts are reduced by online image re-ranking method in efforts are limited to just one-click feedback which is a useful way to improve search results. This type of strategy has been adopted by main web image search engines. Its diagram is shown in Fig. 1.

For a user given query keyword input, a pool of images which are relevant to the given query keyword is retrieved by the search engine. The retrieval has been done with respect to a stored word-image index file. Generally the size of the retrieved image pool is fixed, for instance containing 1000 images. From the pool of returned achieve improved efficiency, short visual feature vectors are needed and fast matching process is to be done. To achieve high efficiency, the visual feature vectors need to be short and their matching should be done faster. A number of popular visual features are in high efficiency and dimensions are not acceptable if they are directly matched.

The following literature surveys various methods for efficient image search and re-ranking of web images.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 2, Issue 10, October 2014

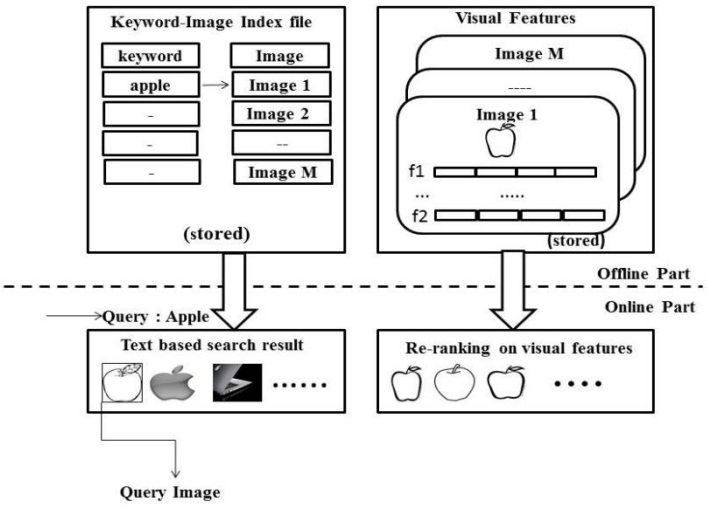

Figure 1: Traditional image re-ranking framework

II WEB IMAGE SEARCH AND RE-RANKING METHODS

A. *Techniques used for Web Image Search:*

1. Relevance Feedback in Image Retrieval

In [1] Dacheng Tao.et.al presented a set of new algorithms to improve the SVM RF for CBIR. Content based image retrieval (CBIR) widely uses Relevance feedback schemes which are based on support vector machines (SVM). Retrieval of images from a huge database is a challenging research field with the explosive growth of image records and the fast increase of computer power. The motive and key idea for this work is taken from the classifier committee learning (CCL). As each classifier has its distinct capability and property to classify relevant and irrelevant class samples, the CCL can group weak classifiers to improve the recognition performance. In order to improve the SVM performance, this work uses bagging and a random subspace method which shows more effectiveness when the conventional classifier is not stable.

2. Bridging gap of visual to semantic features

In [2] Nikhil Rasiwasia et.al presented a query-by-semantic-example (QBSE) which is combined from the method of query-by-visual-example (QBVE) and semantic retrieval (SR). Generally In semantic retrieval (SR) Images are labelled with regards to terms of visual concepts. Each image is then characterized by a vector, transferred to as a semantic multinomial, of posterior idea probabilities. Retrieval is done by the query-by-example hypothesis in which the user gives a query image, for which two mechanisms are done. Firstly a semantic multinomial is computed and secondly the computed resultant is matched to those in the database. Query-by-visual-example shows two major properties of interest, one is practical and the other is related to philosophical. QBSE constructs retrieval systems that are more accurate than what was an earlier system when considered as a practical standpoint as it takes over the generalization ability of SR inside the space of known visual concepts which is referred to as the semantic space. Philosophically, QBSE facilitates the aim of experiments that clearly test the value of semantic illustrations for image retrieval as it lets a straight comparison of visual and semantic demonstrations under a general query hypothesis.

3. Relative Attribute Feedback for Image Search

In [3] Adriana et.al presented a novel form of feedback for image search using relative attributes. In this method a user illustrates which properties of exemplar images should be altered to facilitate more closely match users mental model of the image(s) sought. The presented approach initially learns a group of ranking methods in offline modal in which the relative strength of a nameable attribute in an image is predicted. During querying the system shows a preliminary set of reference images, then user picks an image among them to present relative attribute feedback.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 2, Issue 10, October 2014

Relative function updation and image pool re-ranking is done by using the resulting constraints in the multi-dimensional attribute space. This method is repeated using the gathered constraints until the top ranked images are relatively close to the user's target solution. By doing this, the presented method permits a user to proficiently "whittle away" irrelevant parts of the visual feature space by means of semantic language to exactly communicate user's preferences to the system.

4. Refinement of search result through deep context
In [4] Junyang et.al presented the deep context method for detecting outliners which refines the search results. The presented method sort out the most probable irrelevant images which is considered as the spare information that is not limited in the existing search results. The presented deep contexts for each image gather a group of images that are retrieved by searches by makes use of queries figured by the textual term of the image. Comparison can be done with the status of this image in the present search results and the deep contexts in order to verify the irrelevance score. Subsequently the irrelevance scores are transmitted to the images whose useful textual term is missed. Next two schemes have been formulated by combined process to attain a Markov random field, which is efficiently solved by graph cuts. The key is that presented method does not suits on the hypothesis that relevant images are visually combined among top results and is based on the inspection that an outlier under the present query is probably similar to be more popular under various other query.

5. Retrieval based on Unsupervised Semantic Feature Discovery
In [5] Yin-Hsi Kuo et.al presented a unsupervised semantic feature discovery concepts to overcome the difficulty by leveraging both the associated textual information and image contents in the social media in order to estimate the semantic illustrations for the two modalities. The presented work uses common structure to augment each image with relevant semantic namely textual and visual features by using graphs among images. This structure automatically determines relevant semantic features by generation and selection in visual and textual image graphs in an unsupervised way. This method examines the successiveness of the framework when using dissimilar optimization systems for maximizing effectiveness. This can be directly applied to several applications, such as tag refinement, image object retrieval and keyword-based image searches.

B. *Technique Used For Re-Ranking*

1. Online Image search re-ranking
In [6] Jingyu et.al presented online image search re-ranking algorithm which is based on query image and no online training has been done. This work presents Adaptive Similarity which is encouraged by the scheme that a user constantly has a detailed intention while submitting a query image. For instance, when the user submits an image with a full-size face in the centre, almost certainly user requires images with similar face. Initially the query image is characterized into one of numerous predefined categories. Within each category, a particular weight schema is found to be combined with the features adaptive to this type of images. When using this image to query, the user intension is reflected by measuring the association between query image and its appropriate similarity measurement and these categories are named as Intentions. The particular weighting schema within each intention category is associated by minimizing the rank loss for every query images on a training set by the present method which is actually modified from Rank Boost technique.

2. Visual and Textual Content Based Re-Ranking
In [7] Xiaoou et.al presented novel Internet image search approach based on visual and textual content based re-ranking. This technique requires only one-click user feedback. Intention specific weight schema is used to unite visual features and to calculate visual adaptive similarity to query images. Despite of human feedback, visual and textual expansions of keywords are incorporated to attain user intention. Expanded keywords are utilized to broaden positive instance images and also widen the image pool to hold additional relevant images. This structure makes it promising for commercial range image search by both visual and text term. The presented image re ranking structure comprises of several steps, which can be enhanced independently or replaced by other methods which is considered consistently effective.

ISSN(Online): 2320-9801
ISSN (Print): 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(An ISO 3297: 2007 Certified Organization)

Vol. 2, Issue 10, October 2014

3. Visual Rank

In [8] Yushi Jing et.al presented Visual Rank algorithm, a straightforward method to include the advances made in using network and link investigation for Web document search into image search. Visual Rank appears to diverge from a critical source of information which makes Page Rank more successful: the huge amount of manually produced links on a diverse set of pages. On the other hand, a major quantity of the human-coded information is reconvened by two systems. Firstly Visual Rank query dependent is made in which the initial set of images are selected from retrieved answers and human knowledge by means of connecting relevant images to Web pages which is openly initiated into the system. Secondly the image similarity graph is developed based on the general features among images. Those images that detain the common subjects from other images are generally results in higher relevancy.

4. Supervised Re-ranking

In [9] Linjun Yang & Alan Hanjalic presented supervised learning hypothesis into the visual search re-ranking idea to produce a more robust re-ranking system. The idea controls the merits of both supervised concept-related search and unsupervised visual related search re-ranking, whereas it does not undergoes from scalability issues which represents the concept-based image search. To deal with this the presented approach in this method defines a learning-to re rank structure, which incorporated the adapted Ranking SVM algorithm and 11 lightweight re-ranking features that determines the relevance between the visual and textual queries of images.

5. Bayesian Visual Re-ranking

In [10] Xinmie Tian.et.al presented Bayesian visual re-ranking which model the visual and textual information from the probabilistic viewpoint and makes visual re-ranking as an optimization system in the Bayesian framework. In this scheme, the textual information is replicated as likelihood, to reproduce the divergence between text-based search results and re-ranked results which is described as ranking distance. The visual information is replicated as a conditional prior, to point the ranking score uniformity among visually similar examples which is known as visual consistency. Bayesian visual re-ranking method obtains the best re-ranking consequences by maximizing visual uniformity whereas minimizing distance of ranking. In order to figure out the ranking distance more specifically, a novel pair-wise method is used in which it computes the ranking distance with respect to the divergence in terms of pair-wise instructions. For visual uniformity, three different regularizes are investigated to extract the greatest way for its modelling.

III **CONCLUSION**

The present survey presents various methods used for image searches and re-ranking of web-scale images. Each surveyed method is significantly efficient in image retrieval process and ranking of images. This paper shoes the pros and cons of each method in various aspects. The efficiency of the surveyed method can be measured in terms of retrieval accuracy and computational time. The merits of each method can be taken into account and further these techniques can be enhanced for large scale web image searches and re-ranking mechanism efficiently.

REFERENCES

1. D. Tao, X. Tang, X. Li, and X. Wu, “Asymmetric Bagging and Random Subspace for Support Vector Machines-Based Relevance Feedback in Image Retrieval,” IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 28, no. 7, pp. 1088-1099, July 2006.
2. N. Rasiwasia, P.J. Moreno, and N. Vasconcelos, “Bridging the Gap: Query by Semantic Example,” IEEE Trans. Multimedia, vol. 9,no. 5, pp. 923-938, Aug. 2007
3. Kovashka, D. Parikh, and K. Grauman, “Whittle Search: Image Search with Relative Attribute Feedback,” Proc. IEEE Conf. Computer Vision and Pattern Recognition (CVPR), 2012.
4. J. Lu, J. Zhou, J. Wang, X. Hua, and S. Li, “Image Search Results Refinement via Outlier Detection Using Deep Contexts,” Proc. IEEE Conf. Computer Vision and Pattern Recognition (CVPR), 2012.
5. Y. Kuo, W. Cheng, H. Lin, and W. Hsu, “Unsupervised Semantic Feature Discovery for Image Object Retrieval and Tag Refinement,” IEEE Trans. Multimedia, vol. 14, no. 4, pp. 1079-1090, Aug. 2012
6. J. Cui, F. Wen, and X. Tang, “Real Time Google and Live Image Search Re-Ranking,” Proc. 16th ACM Int’l Conf. Multimedia, 2008.
7. X. Tang, K. Liu, J. Cui, F. Wen, and X. Wang, “Intent Search: Capturing User Intention for One-Click Internet Image Search,” IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 34, no. 7, pp. 1342-1353, July 2012.
8. Y. Jing and S. Baluja, “Visual Rank: Applying Page Rank to Large-Scale Image Search,” IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 30, n
9. L. Yang and A. Hanjalic, “Supervised Re-ranking for Web Image Search,” Proc. ACM Int’l Conf. Multimedia, 2010.o. 11, pp. 1877-1890, Nov. 2008
10. X. Tian, L. Yang, J. Wang, X. Wu, and X. Hua, “Bayesian Visual Re-ranking,” IEEE Trans. Multimedia, vol. 13, no. 4, pp. 639-652, Aug. 2011.