Click Prediction for Image Re-Ranking using Query-Specific Semantic Signature

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***Abstract*—Image re-ranking is a successful method to get better results of text-based image search. User click data has been used in image re-ranking, clicks have been exposed to more exactly express the relevance of retrieved images to search query. A significant problem for click-based method is the need of click data, since only a short number of web images have been clicked-on by users. To solve this problem with predicting image clicks, we propose a query specific method for image click prediction, and apply the obtained click information to the image re-ranking. A query keywords given, from a pool of images is first retrieved based on textual information. The user have to pick a query picture from the pool, the remaining images are re-ranked based on their optical similarity with the query picture. A most important challenge is that the similarities of visual features do not well associate with images semantic meanings which interpret users search purpose. The proposed method is based on query-specific which is significantly to increase both the accurateness and effectiveness of image re-ranking.**

Keyword— Image search, image re-ranking, click.

I. INTRODUCTION

Image search technology has become an active and challenging research topic. Image search engines as Google use textual meta-data included in the surrounding text web images. While the performance of text-based image retrieval for several searches is acceptable, the accuracy and efficiency of the retrieved outcome might still be improved significantly. There is a major problem in impacting performance is the mismatches between the actual content of image and the textual data on the web page. One of the method is used to solve this problem is image re-ranking, in which textual information is combined to return improved results to the user. Extracted visual information is then used to re-rank related. Web image search engines repeatedly use keywords as queries and rely on nearby text to search images. They experience from the ambiguity of query keywords, because it is tough for users to exactly illustrate the image content of target images only using keywords. Image retrieval is a computer technique for searching and retrieving images from a huge database of images. Image search is a particular information search used to find images.

The text based image retrieval has been commonly used in trendy image search engines such as Google, Bing and Yahoo. A user is required to give input a keyword as a textual query to the retrieval system. Then the system precedes the ranked relevant images whose nearby texts contain the query keyword, and the ranking keep score is obtained according to a little similarity measurements between the query keyword and the textual description of relevant images. Text-based search techniques have been established to complete well in textual documents they often result in mismatch when useful to the image search. The basis is that metadata cannot signify the semantic content of images.

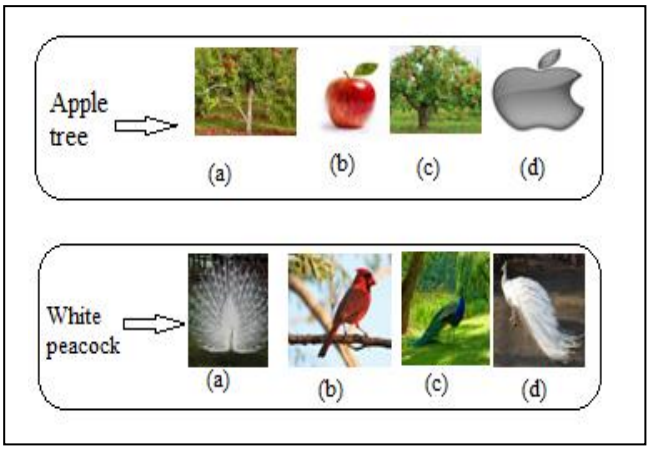

Fig. 1. Example of images according to the query of "apple tree" and "white Peacock".

In this paper we propose a query specific semantic signature for click prediction and apply the predicted to re-rank web images. Here we are construct a web image with related click explanation, together from a commercial search engine. As shown in Fig. 1, the search has engine recorded for each image click. Fig. 1(a), (c), (a) and (d) indicate that the images with high click are strongly relevant to the queries, while Fig. 1(b), (d), (b) and (c) present non-relevant images with zero clicks. These two are mechanisms from the image bases.

Image re-ranking is an effective way to improve search results and its interaction is simple sufficient. Web image search engine has adapted to this approach as user intention for one click internet image search. A query keyword input is given by a user, a pool of images related to the query text are retrieved by the search engine according to a stored word image index file. By means of asking the user to select a query image, which reflects the user search intention, from the pool, the enduring images in the pool are re-ranked based on their visual similarities with the query image. The Various popular visual features are in high dimensions and effectiveness is not satisfactory if they are directly matched.

II. RELATED WORK

Several approximation algorithms were proposed by different authors for image search re-ranking in image processing. Jun et all [1], in this paper they proposed multimodel sparse coding to solve the problem of click prediction. Yue et all [2], gives a brief description on 3-D object retrieval with query view selection. The retrieval is done by matching the views of the query object with the objects in database. Lixin et all [3], they proposed bag ranking method to rank all the bags according to the bag ranking score. Multi instance learning methods have been proposed to solve learning problems with ambiguity in training samples. Shenghua et all [4], in this paper they proposed laplacian sparse coding framework. Sparse coding is a signal processing technique. A multimodal graph-based learning approach for web image search re-ranking. It is able to integrate multiple modalities into a graph-based learning framework. This approach simultaneously learns the relevance scores, weights of modalities, and the distance metric and it is scaling for each modality. Meng et all [5], introduces a web image search re-ranking approach that explores multiple modalities in a graph based learning. The semi-supervised method is used to solve a problem insufficiency training data. Meng et all [6], the proposed method optimized multi-graph based semi supervised learning. This method is used for video retrieval. Xinmie et all [7], introduces visual re-ranking is a effective text based image search. Bayesian visual re-ranking using this method optimizes the problem. This unified framework will result in a more robust and accurate ranking model to be learned as noises in textual features can be suppressed by visual content information. Bo et all [8], gives a brief description on content aware ranking model based on learning to rank framework, in which textual and visual information are simultaneously leveraged in the ranking learning process.

Georges and Ciya [9], gives a brief description on click patterns is interpreted in order to compare different ranking functions. Changhu et all [10], it describes a multi label sparse coding framework for feature extraction and classification within the context of automatic image annotation. The approach is naturally derived by relaxing the restrictive cardinality constraint of vector quantization. Jianchao et all [11], in this paper proposed approach to computes a spatial-pyramid image representation based on sparse codes, instead of the vector quantization in the traditional spatial pyramid matching. They proposed a geometrically motivated relevance feedback scheme for image ranking. Xiaofei et all [12], this paper is to discover the image manifold by a locality-preserving mapping for image retrieval. Bo et all [13], gives a framework to approximate the intrinsic manifold. Learns both a composite manifold and a semi-supervised learner jointly, leading to a unified framework. Jun et all [14], in this paper they proposed method multi-view hypergraph learning. Linear multiple feature embedding algorithm is proposed. This algorithm is used to handle the high-dimensional and multi-model image features in the large-scale image retrieval setting. Yangxi et all [15], in their work focus on a query difficulty guided image retrieval system, which is used to predict the queries ranking performance. Linear multiple feature embedding algorithm is proposed.

III. CLICK BASED RE-RANKING FOR WEB IMAGE SEARCH

In this part, we present an overview of all important algorithms and components, which are required to implement the method. We will apply the click based approach to our system. In our proposed approach the processing of query consists of steps as follows:

A. User Interaction

The user login their details will be verified by the admin. Each and every process done by the user will be under the control of admin. Only the authorized user is allowed to interact with image search. User submits the query associated to image user want to search to the middleware through the web-based interface.

B. Retrieval of Images

Image retrieval techniques use text to describe the content of the image, which frequently creates uncertainty and inadequacy in query processing and performing an image database search. The procedure of assigning meta data with keywords to a digital image is known as automatic image annotation. The middleware after that checks whether the query provided by the user is valid or invalid by the method of filtering. If query is valid i.e. the query for searching an image, afterward it queries the Search engine with the same query provided by user. It subsequently retrieves the top related images from the search engine.

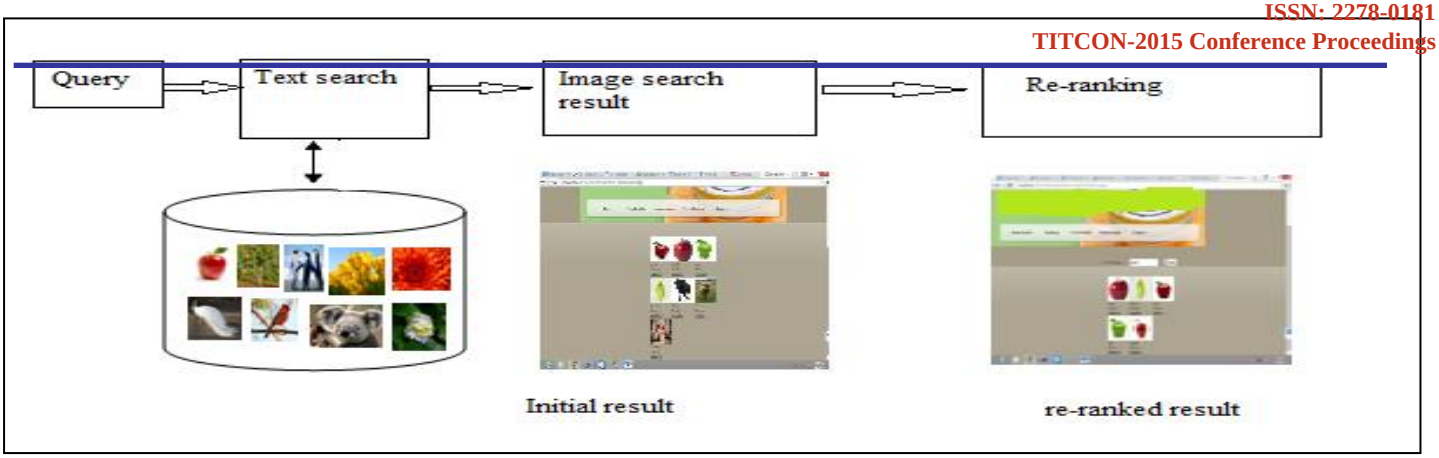

Fig. 2. Framework of web search Image re-ranking.

C. User Click

Image search is a particular data search used to get images. To search used for images, a user can give query conditions such as keyword or click on some image, and the system will return images related to the query. The similarity used for search criteria might be meta tags, color distribution in images, shape attributes. The majority search engines perform their text query and retrieval using keywords. The user has login into the web-page and then they provide a query to search images and the image will be retrieve from the database. So the user can click the images and the click related information also stored in the database.

D. Re-ranking

The major system of web image search re-ranking is query processing, document considerate, indexing and ranking. Query processing is wherever user-generate queries are changed into format interpretable by the search engine. Document considerate is which extracts metadata from the related webpage to represent an image. Re-ranking is which retrieves and ranks images based on their relevance to the query. The Re-ranking will be done based on the user click on the images. 0 click images are in the least relevant image for the user search query. The Most clicked images are the more relevant image for the user search query.

It is diagram is shown in Fig. 2. As a keyword "apple" used for the retrieved images fit in to special categories, such as "green apple", "apple laptop", and "apple tree". In order to resolve the uncertainty we are using the image retrieval with relevance feedback. User has to select multiple relevant and irrelevant images examples visual similarity metrics. Images are re-ranked based taking place of learned visual similarity. Web scale commercial system designed for user feedback has to be restricted to the least with no guidance.

In this paper, a query specific semantic signature is proposed for web image re-ranking. As a replacement for of manually defining a worldwide conception dictionary, there it learns different semantic spaces for different query keywords are in separately and automatically. Here the semantic space associated to the images to be re-ranked can be a lot pointed down by the query keyword provided by the user. For example, if the query is "apple," the concepts of "bulls" and "bulldog" are irrelevant and must be excluded.

The query specific semantic spaces can more exactly model the images to be re-ranked. They have excluded further potentially limitless number of irrelevant concepts, which serve just as noise and get not as good as the re-ranking performance on both accuracy and computational cost. The visual and textual features of images to be followed by projected into their correlated semantic spaces to get semantic signatures. Images are re-ranked by comparing their semantic signatures obtained from the semantic space of the query keyword. It is diagram is shown in Fig. 3 Process and steps involved in image re-ranking.

The semantic association between concepts is explored and integrated when computing the similarity of semantic signatures. Our experiments illustrate that the semantic space of a query keyword can be described by just 20-30. So the semantic signatures are extremely short and image re-ranking becomes extremely efficient. As of the large number of keywords and the dynamic variations of the web, the semantic spaces of query keywords to be automatically learned through keyword expansion.

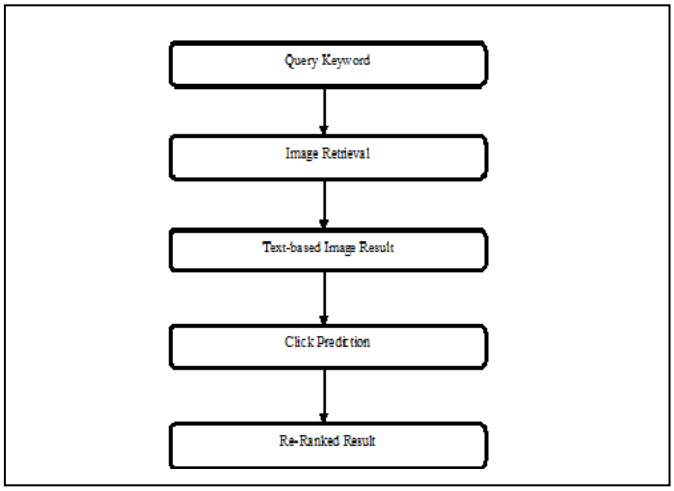

Fig. 3. Process and steps involved in image re-ranking.

IV. EXPERIMENTAL EVALUATION

To show the efficiency of the proposed method, we do experiments on a real-world dataset with images together from a search engine. Given a query text images are retrieved from the whole web using the search engine. The performance before and after re-ranking is shown in Fig 2 .In this method Here it remove the irrelevant image and place the relevant image. Search all day by means of the huge amounts of indexed web pages, we be expecting top-ranked images will be more representative. The relevance model opinion will be more exact and reliable for each query. We send the similar text to Google Web Search and get a list of relevant image via Google Web APIs. Before calculating the information from this top-ranked, we take away all xml tags, filter out words appearing in the query stop word list, count the word how many times it occurs in the page, which are all ordinary pre processing in the image Retrieval systems and usually improve retrieval performance.

V. CONCLUSION AND FUTURE WORK

A novel framework is proposed for web image search re-ranking. The semantic gap related to the images to be re-ranked can be extensively pointed down by the query keyword provided by the user. The query-specific semantic spaces can more accurately model for the images to be re-ranked. It is excluded other potentially limitless number of unrelated concepts, which provide only as noise and get worse the re-ranking performance on both accurateness and computational rate. The visual and textual features of images are followed by proposed into their connected semantic spaces to get semantic signatures. The semantic relationship between concepts is explored and integrated when computing the likeness of semantic signatures. New results on real-world data sets have established that the proposed method is useful in determining click prediction. Additional experimental results on image re-ranking suggest that this method can improve the results returned by commercial search engines. In the future our framework can be improved along several directions. Image re-ranking might be more enhanced by incorporating other metadata and log data alongside by the textual and visual features for result the keyword expansions used for defining the reference classes. The data of client queries provides useful co-occurrence in order of keywords for keyword extension. In order to additional improve the quality of re-ranked images; it must be re-ranked not only by content similarity but also by the visual excellence of the images.

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