

# Query- Specific Semantic Signatures Based Web Image Re- Ranking

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## I.INTRODUCTION

**Abstract** - Image re-ranking, as an effective way to improve the results of web- based image search, has been adopted by current commercial search engines such as Bing and Google. Given a query keyword, a pool of images is first retrieved based on textual information. By asking the user to select a query image from the pool, the remaining images are re-ranked based on their visual similarities with the query image. A major challenge is that the similarities of visual features do not well correlate with images' semantic meanings which interpret users' search intention. Recently people proposed to match images in a semantic space which used attributes or reference classes closely related to the semantic meanings of images as basis. However, learning a universal visual semantic space to characterize highly diverse images from the web is difficult and inefficient. In this paper, propose a novel image re-ranking framework, which automatically offline learns different semantic spaces for different query keywords. The visual features of images are projected into their related semantic spaces to get semantic signatures. At the online stage, images are re-ranked by comparing their semantic signatures obtained from the semantic space specified by the query keyword. The proposed query-specific semantic signatures significantly improve both the accuracy and efficiency of image re-ranking. The original visual features of thousands of dimensions can be projected to the semantic signatures as short as 25 dimensions. Experimental results show that 25-40 percent relative improvement has been achieved on re-ranking precisions compared with the state-of-the-art methods.

**Index Terms**—Image search, image re-ranking, semantic space, semantic signature, keyword expansion

Image retrieval is the process of browsing, searching and retrieving images from a large database of digital images. The collection of images in the web are growing larger and becoming more diverse. Retrieving images from such large collections is a challenging problem. One of the main problems highlighted was the difficulty of locating a desired image in a large and varied collection. While it is perfectly possible to identify a desired image from a small collection simply by browsing, more effective techniques are needed with collections containing thousands of items. To search for images, a user may provide query terms such as keyword, image file/link, or click on some image, and the system will return images "similar" to the query. The similarity used for search criteria could be Meta tags, color distribution in images, region/shape attributes, etc. Unfortunately, image retrieval systems have not kept pace with the collections they are searching. The shortcomings of these systems are due both to the image representations they use and to their methods of accessing those representations to find images. The problems of image retrieval are becoming widely recognized, and the search for solutions an increasingly active area for research and development. In recent years, with large scale storing of images the need to have an efficient method of image searching and retrieval has increased. It can simplify many tasks in many application areas such as biomedicine, forensics, artificial intelligence, military, education, web image searching. Most of the image retrieval systems present today are text-based, in which images are manually annotated by text-based keywords and when we query by a keyword, instead of looking into the contents of the image, this system matches the query to the keywords present in the database.

This technique has its some disadvantages:

- a) Firstly, considering the huge collection of images present, it's not feasible to manually annotate them.
- b) Secondly, the rich features present in an image cannot be described by keywords completely.

These disadvantages of text-based image retrieval techniques call for another relatively new technique known as Content-Based Image Retrieval (CBIR). CBIR is a technology that in principle helps organize digital image archives according to their visual content. This system distinguishes the different regions present in an image based on their similarity in color, pattern, texture, shape, etc. and decides the similarity between two images by reckoning the closeness of these different regions. The CBIR approach is much closer to how we humans distinguish images. Thus, we overcome the difficulties present in text-based image retrieval because low-level image features can be automatically extracted from the images by using CBIR and to some extent they describe the image in a more detail compared to the text-based approach.

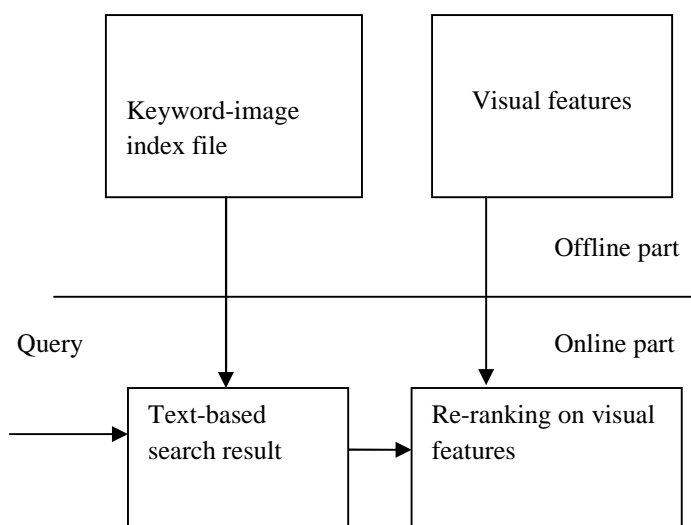


Fig 1.The conventional image re-ranking framework

## II. PROBLEM DEFINITION

Online image re-ranking, which limits users' effort to just one-click feedback, is an effective way to improve search results and its interaction is simple enough. Major web image search engines have adopted this strategy. Its diagram is shown in Fig.1 Given a query keyword input by a user, a pool of images relevant to the query keyword are retrieved by the search engine

according to a stored word-image index file. Usually the size of the returned image pool is fixed, e.g., containing 1000 images. By asking the user to select a query image, which reflects the user's search intention, from the pool, the remaining images in the pool are re-ranked based on their visual similarities with the query image. The word image index file and visual features of images are precomputed offline and stored.<sup>1</sup> The main online computational cost is on comparing visual features. To achieve high efficiency, the visual feature vectors need to be short and their matching needs to be fast. Some popular visual features are in high dimensions and efficiency is not satisfactory if they are directly matched. Another major challenge is that, without online training, the similarities of low-level visual features may not well correlate with images' high-level semantic meanings which interpret users' search intention. Some examples



Fig 2.All the images shown in this figure are related to palm trees. They are different in color, shape, and texture.

Moreover, low-level features are sometimes inconsistent with visual perception. For example, if images of the same object are captured from different viewpoints, under different lightings or even with different compression artifacts, their low-level features may change significantly, although humans think the visual content does not change much. To reduce this semantic gap and inconsistency with visual perception, there have been a number of studies to map visual features to a set of predefined concepts or attributes as semantic signatures. For example, Kovashka et al. proposed a system which refined image search with relative attribute feedback. Users described their search intention with reference images and a set of pre-defined attributes. These concepts and attributes are pre-trained offline and have tolerance with variation of visual content. However, these approaches are only applicable to closed image sets of relatively small sizes, but not suitable for online web-scale image re-ranking. According to our empirical study, images retrieved by 120 query keywords alone include more than 1,500 concepts. It is difficult and inefficient to design a huge concept dictionary to characterize highly diverse web images. Since the topics of web images

change dynamically, it is desirable that the concepts and attributes can be automatically found instead of being manually defined.

### III. EXISTING SYSTEM

Web-Scale image search engines mostly use keywords as queries and rely on surrounding text to search images. They suffer from the ambiguity of query keywords, because it is hard for users to accurately describe the visual content of target images only using keywords. For example, using “apple” as a query keyword, the retrieved images belong to different categories (also called concepts in this paper), such as “red apple,” “apple logo,” and “apple laptop.” This is the most common form of text search on the Web. Most search engines do their text query and retrieval using keywords. The keywords based searches they usually provide results from blogs or other discussion boards. The user cannot have a satisfaction with these results due to lack of trusts on blogs etc. low precision and high recall rate. In early search engine that offered disambiguation to search terms. User intention identification plays an important role in the intelligent semantic search engine

#### A. DISADVANTAGES

- ✓ Some popular visual features are in high dimensions and efficiency is not satisfactory if they are directly matched.
- ✓ Another major challenge is that, without online training, the similarities of low-level visual features may not well correlate with images' high-level semantic meanings which interpret users' search intention.

### IV. PROPOSED SYSTEM

In this paper, a novel framework is proposed for web image re-ranking. Instead of manually defining a universal concept dictionary, it learns different semantic spaces for different query keywords individually and automatically. The semantic space related to the images to be re-ranked can be significantly narrowed down by the query keyword provided by the user. For example, if the query keyword is “apple,” the concepts of “mountain” and “Paris” are irrelevant and should be excluded. Instead, the concepts of “computer” and “fruit” will be used as dimensions to learn the semantic space related to “apple.” The query-specific semantic spaces can more accurately model the images to be re-ranked, since they have excluded other potentially unlimited number of irrelevant concepts, which serve only as noise and deteriorate the re-ranking performance on both accuracy and computational cost. The visual and

textual features of images are then projected into their related semantic spaces to get semantic signatures. At the online stage, images are re-ranked by comparing their semantic signatures obtained from the semantic space of the query keyword. The semantic correlation between concepts is explored and incorporated when computing the similarity of semantic signatures. We propose the semantic web based search engine which is also called as Intelligent Semantic Web Search Engines. We use the power of xml meta-tags deployed on the web page to search the queried information. The xml page will be consisted of built-in and user defined tags. Here propose the intelligent semantic web based search engine.

#### A. ADVANTAGES

- ✓ The visual features of images are projected into their related semantic spaces automatically learned through keyword expansions offline.
- ✓ Our experiments show that the semantic space of a query keyword can be described by just 20-30 concepts (also referred as “reference classes”). Therefore the semantic signatures are very short and online image re-ranking becomes extremely efficient. Because of the large number of keywords and the dynamic variations of the web, the semantic spaces of query keywords are automatically learned through keyword expansion.

### V. DATAFLOW DIAGRAM

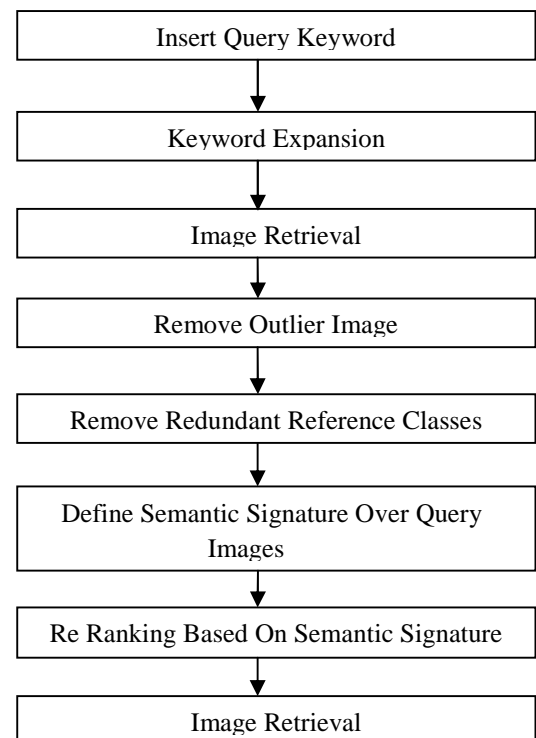


Fig.3.Dataflow Diagram

## VI. MODULES

- A. Information retrieval.
- B. Search engine.

### A. Information Retrieval

Information retrieval by searching information on the web is not a fresh idea but has different challenges when it is compared to general information retrieval. Different search engines return different search results due to the variation in indexing and search process.

### B. Search engine

Our search engine first searches the pages and then gets the result searching for the metadata to get the trusted results search engines require searching for pages that maintain such information at some place. Here propose the intelligent semantic web based search engine. we use the power of xml meta-tags deployed on the web page to search the queried information. the xml page will be consisted of built-in and user defined tagsour practical results showing that proposed approach taking very less time to answer the queries while providing more accurate information.

## VII. CONCLUSION AND FUTURE ENHANCEMENT

### A. Conclusion

Proposed a novel image re-ranking framework, which learns query-specific semantic spaces to significantly improve the effectiveness and efficiency of online image reranking. The visual features of images are projected into their related visual semantic spaces automatically learned through keyword expansions at the offline stage. The extracted semantic signatures can be 70 times shorter than the original visual feature on average, while achieve 20%35% relative improvement on re-ranking precisions over state-of the-art methods.

### B. Future Enhancement

In the future work, our framework can be improved along several directions. Finding the keyword expansions used to define reference classes can incorporate other metadata and log data besides the textual and visual features. For example, the co-occurrence information of keywords in user queries is useful and can be obtained in log data. In order to update the reference classes over time in an efficient way, how to adopt incremental learning under our

framework needs to be further investigated. Although the semantic signatures are already small, it is possible to make them more compact and to further enhance their matching efficiency using other technologies such as hashing.

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