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Approaches for User Image Search-goals with Implicit Guidance of User: A Survey

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Abstract: ***Search engines are programs that search documents for specified keywords and returns a list of the documents where the keywords were found. A*** **search engine** ***is really a general class of programs; however, the term is often used to specifically describe systems like Google, Bing and Yahoo! Search that enable users to search for documents on the World Wide Web. The Text Component, The Link Component, The Popularity Component are the 3 Key Components in Search Engine Optimization. The inference and analysis of user search goals can be very useful in improving search engine relevance and user experience. Although the research on inferring user goals or intents for text search has received much attention, little has been proposed for image search. To indicates high correlations among the clicked images in a session in user click-through logs, and combine it with the clicked images' visual information for inferring user image-search goals, we propose to leverage click session information.***

Keywords: Image-search goals, Click-through logs, Search Engine, *Web-based Search Engines, Re-ranking*

1. Introduction

A search engine is a web-based tool that enables users to locate information on the World Wide Web. Popular examples of search engines are Google, Yahoo!, and MSN Search. On the Internet, a search engine is a coordinated set of programs that includes: A spider (also called a "crawler" or a "boot") that goes to every page or representative pages on every Web site that wants to be searchable and reads it, using hypertext links on each page to discover and read a site's other pages A program that creates a huge index (sometimes called a "catalog") from the pages that have been read A program that receives your search request, compares it to the entries in the index, and returns results to you An alternative to using a search engine is to explore a structured directory of topics.

The Search engines is work as by provide an interface to a group of items that enables users to specify criteria about an item of interest and have the engine find the matching items. The criteria are referred to as a search query. In the case of text search engines, the search query is typically expressed as a set of words that identify the desired concept that one or more documents may contain. There are several styles of search query syntax that vary in strictness. It can also switch names within the search engines from previous sites. Whereas some text search engines require users to enter two or three words separated by white space, other search engines may enable users to specify entire documents, pictures, sounds, and various forms of natural language. Some search engines apply improvements to search queries to increase the likelihood of providing a quality set of items through a process known as query expansion.

For example Index-based search engine-The list of items that meet the criteria specified by the query is typically sorted, or ranked. Ranking items by relevance (from highest to lowest) reduces the time required to find the desired information. Probabilistic search engines rank items based on measures of similarity (between each item and the query, typically on a scale of 1 to 0, 1 being most similar) and sometimes popularity or authority (see Bibliometrics) or use relevance feedback. Boolean search engines typically only return items which match exactly without regard to order, although the term *Boolean search engine* may simply refer to the use of Boolean-style syntax (the use of operators AND, OR, NOT, and XOR) in a probabilistic context. To provide a set of matching items that are sorted according to some criteria quickly, a search engine will typically collect metadata about the group of items under consideration beforehand through a process referred to as indexing. The index typically requires a smaller amount of computer storage, which is why some search engines only store the indexed information and not the full content of each item, and instead provide a method of navigating to the items in the search engine result page. Alternatively, the search engine may store a copy of each item in a cache so that users can see the state of the item at the time it was indexed or for archive purposes or to make repetitive processes work more efficiently and quickly.

Other types of search engines do not store an index. Crawler, or spider type search engines (a.k.a. real-time search engines) may collect and assess items at the time of the search query, dynamically considering additional items based on the contents of a starting item (known as a seed, or seed URL in the case of an Internet crawler). Meta search engines store neither an index nor a cache and instead simply reuse the index or results of one or more other search engines to provide an aggregated, final set of results.

Three Essential Parts To Search Engine Optimization
1.1] The Text Component
1.2] The Link Component
1.3] The Popularity Component

1.1] The Text Component
Search engine optimization starts with the text component. This essentially means targeting one appropriate keyword per page on your website. There are many parts to this, but in

summary, this means putting the right keyword, in the right places, in the right frequency. All search engines look for the keywords the person typed into their search box in several places on your web page, and it wants to see that keyword phrase used the appropriate amount of times. If your site does this better than your competitors, you will score well in the text component of search engine optimization.

1.2] The Link Component
Search engines want to know which pages on your site are the most important to your site. They can tell this from many ways, but the link component is a key for your site.
Essentially, search engines count up how many links from within your site point back to other pages on your site. Search engines consider 2 important factors:

1.2.1) The pages on your site that have more links pointing to them are considered to be more important. These pages get a better link component score.
1.2.2) The more important the page is on your site, the more value the link has. In other words, links coming from your home page are more important than links coming from some obscure page on your site.

1.3] The Popularity Component
The popularity component refers to links from other sites coming from your site. Years ago, any link coming to your site provided value. Unfortunately, many people made tools that provided irrelevant links to your site, and the search engines learned that these unrelated links didn't help. Now, the search engines tell us that the following factors are critical in the popularity component:

- The incoming link must be related to your site
- The incoming link should be coming from a popular site to provide value
- The incoming link should be in clean HTML code so that the link is easy for the search engine spider to follow

2.Types of Web-Based Search Engines

2.1] Image Search Engine
Is a type of search engine specialized on finding pictures, images, animations etc. Like the text search, image search is an information retrieval system designed to help to find information on the Internet and it allows the user to look for images etc. Using keywords or search phrases and to receive a set of thumbnail images, sorted by relevancy.

2.2] Web Search Engine
Is a software system that is designed to search for information on the World Wide Web. The search results are generally presented in a line of results often referred to as search engine results pages (SERPs). The information may be a mix of web pages, images, and other types of files. Some search engines also mine data available in databases or open directories. Unlike web directories, which are maintained only by human editors, search engines also maintain real-time information by running an algorithm on a web crawler.

2.3] Visual Search Engine
Is a search engine designed to search for information on the World Wide Web through the input of an image or a search engine with a visual display of the search results. Information may consist of web pages, locations, other images and other types of documents. This type of search engines is mostly used to search on the mobile Internet through an image of an unknown object (unknown search query). Examples are buildings in a foreign city. These search engines often use techniques for Content Based Image Retrieval.

2.4] Video Search Engine
Is a web-based search engine which crawls the web for video content. Some video search engines parse externally hosted content while others allow content to be uploaded and hosted on their own servers. Some engines also allow users to search by video format type and by length of the clip. Search results are usually accompanied by a thumbnail view of the video. Video search engines are computer programs designed to find videos stored on digital devices, either through Internet servers or in storage units from the same computer. These searches can be made through audiovisual indexing, which can extract information from audiovisual material and record it as metadata, which will be tracked by search engines.

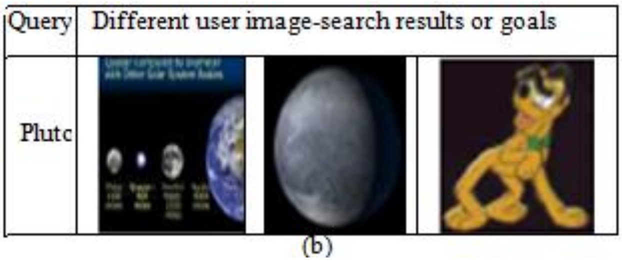
3.Image Searching

Existing web image search engines such as Google, flicker and AltaVista [5] their queries to search engines to represent the information needs of users. In many times or many cases queries may not exactly represent what they want since the keywords may be cover a broad topic and users tend to formulate short queries rather than to take the trouble of constructing long and carefully stated ones. Web image search engines like Google return a large quantity of search results, ranked by their relevance to the given query. Web users have to go through the list and look for the desired ones [1, 2]. This is a time consuming task since the returned results always contain multiple topics and these topics are mixed together. Things become even worse when one topic is overwhelming but it is not what the user desires. Many times users have different search goals for the same query, but they got different result or search goals due to the following three reasons.

I] Multi-representations: in image search, the same thing can be represented from different angles of view such as the query flower.

(a)

II] Multi-concepts: a keyword may represent different things. For example, the query of "Pluto". Pluto in the solar system and the dog named "Pluto" in Disney world.



(b)

III] Multi-forms: the same thing may have different forms. Take "Bumblebee" in the film *Transformers* as an example. It has two modes: car mode and humanoid mode. These two modes are the two forms of "Bumblebee."

(c)

Figure 1: Different user image-search results or goals represented by image examples in image search by (a) Multi-representation, (b) Multi-concepts, (c) Multi-forms

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 [7] 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.

However, although there has been much research for text search, few methods were proposed to infer user search goals in image search. Intuitively, 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 and the click session information 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. In this paper, we define a session in image search as a single query and a series of clicked images as illustrated in Figure 2. Usually, the clicked images in a session have high correlations.

A part of search result returned by A session in the search engine when a user Click-through submitted the query "apple": logs:

(a) (b)

Figure 2: Session for the query apple in user click-through logs. (a) Search results returned by the search engine. The check marks mean that the images were clicked by the user. (b) Session in user click-through logs.

This correlation information provides hints on which images belong to the same search goal from the viewpoint of image semantics. Therefore, in this paper, we propose to introduce this correlation information (named as click session information in this paper) to reduce the semantic gaps between the existing image features and the image semantics. A possible solution to image searching problem is to cluster search results into different groups with different topics [6]. Many works have been done on web text search, We propose to cluster the clicked images for a query in user click through logs under the guidance of click session information to infer user image-search goals. With the introduction of the correlation information, the reliability of visual features can be improved.

4.Literature Review

In recent years, the research on inferring user goals or intents for text search has received much attention. Many early researches define user intents as navigational and informational. Some works focus on tagging queries with more hierarchical predefined concepts to improve feature representation of queries. User search goals and the number of them should be arbitrary and not predefined. Some works analyze the clicked documents (i.e., click content information) for a query in user click through logs to explore user goals.

Zha *et al.* [7] introduced method which is completely depending on "tag". It also tried to captured user goals to give visual suggestions for a query in image search. They first select some tag words as textual suggestions by satisfying two properties: relatedness and informativeness. Then, they collect the images associated with a suggested keyword and cluster these images to select representative images for the keyword. However, the good performance of their method depends on the precision of tags In many web image search engines, manual tags are not available and only external texts are achievable (e.g., Baidu image [3] and Google image). In these cases, the performance of may be decreased by using external texts as the external texts are not as reliable as tags.

Carbonell *et al.* [10] introduced marginal relevance into text retrieval by combining query relevance with information novelty. This information-novelty can be considered as lowlevel textual content novelty. Recent works, model the diversity based on a set of subqueries. The sub-queries are generated by simply clustering the documents in search results or by query expansion. This diversity can be considered as high-level semantic diversity. The research on diversity in image retrieval has just started. There has been some research on image clustering with different types of information. Cai *et al.* [5] first use textual and link information to cluster the images in web pages, and then they use visual information to further cluster the images in each cluster. They consider that a single web page often contains multiple semantics and the blocks in a page containing different semantics (instead of pages) should be regarded as information units to be analyzed. They define link information as the relationships between page, block, and image.

Cheng *et al.* [8] first divide a session into the positive part $\xi+$ and the negative part $\xi-$. After that, they merge the positive parts into chunklets only if the positive parts contain an image in common, and the edges between chunklets are then added if the images in $\xi+$ and $\xi-$ of a session appear in two chunklets, respectively. Finally, clustering is implemented on the chunklet graph. Although their method tried to introduce user information for facilitating visual information, it still has limitations since this method requires the users to identify $\xi+$ and $\xi-$ in each session. However, in real data, it is difficult to divide $\xi+$ and $\xi-$ precisely and ensure that the images in a chunklet will not appear in both $\xi+$ and $\xi-$ of a session simultaneously.

Poblete *et al.* [9] propose to use queries to reduce the semantic gap. They define the semantic similarity graph as an undirected bipartite graph, whose edges connect a set of relative queries and the clicked images for these queries. However, if the set of queries are irrelative, there may be few or no images shared by multiple queries (e.g., the users submitting the different queries do not click the same image). In this case, the queries and their clicked images in the bipartite graph are independent and the semantic similarity graph cannot provide any semantic information. This situation often happens if we randomly select a small set of queries from query logs.

Clustering search results [11] is an effective way to organize search results, which allows a user to navigate into relevant documents quickly. As a primary alternative strategy for presenting search results, clustering search results has been studied relatively extensively. The general idea in virtually all the existing work is to perform clustering on a set of top-ranked search results to partition the results into natural clusters, which often correspond to different subtopics of the general query topic. A label will be generated to indicate what each cluster is about. A user can then view the labels to decide which cluster to look into. Such a Such a strategy has been shown to be more useful than the simple ranked list presentation in several studies. However, this clustering strategy has two deficiencies which make it not always work well: i) The clusters discovered in this way do not necessarily correspond to the interesting aspects of a topic from the user's perspective. For example, users are often interested in finding either “phone codes" or “zip codes" when entering the query “area codes." But the clusters discovered by the current methods may partition the results into “local codes" and “international codes." Such clusters would not be very useful for users; even the best cluster would still have a low precision. ii) The cluster labels generated are not informative enough to allow a user to identify the right cluster. iii) Since feedback is not considered, many noisy search results that are not clicked by the users may be analyzed as well. Wang and Zhai clustered queries and learned aspects of these similar queries , which solves the problem in part. However, their method does not work if we try to discover user search goals of one single query in the query cluster rather than a cluster of similar queries. For example, in [12], the query “car” is clustered with some other queries, such as “car rental,” “used car,” “car crash,” and “car audio.” Thus, the different aspects of the query “car” are able to be learned through their method. However, the query “used car” in the cluster can also have different aspects, which are difficult to be learned by their method.

5. Limitations

- In web search applications, many cases queries may not exactly represent what exactly users want to retrieve since many ambiguous queries may cover a broad topic.
- Different users may want to get information on different aspects when they submit the same query.
- Search engine rankings are frequently inaccurate, In order to understand why they are less than perfect, it is necessary to understand how the rankings are calculated.
- All of the existing re-ranking algorithms require a prior assumption regarding the relevance of the images in the initial, text-based search result.

6. Analysis of Problem

- In Google image provide external texts, and in these case the performance of may be decreased by using external texts as the external texts are not as reliable as tags.
- Zha *et al.* tried to capture what actual user goal’s to give visual suggestions for a query in image search, so for that they select some “Tag Word” as textual suggestions and the good performance of their method is depends on the precision of Tags. But in many web image search engines, manual tags are not available only external texts are achievable.
- In the real situation, many users may click some noisy images. If these noisy images are included, the click session information will become less meaningful.
- The traditional methods, such as K-means clustering and affinity propagation (AP) clustering are improper to handle these arbitrary-shape situations.
- In the edge-reconstruction-based strategy, since the similarity values are not only decided by the visual feature of the images, but are also decided by the click session information, it is difficult for *k*-means like clustering methods to perform proper clustering with this kind of similarity information.
- In the extreme case when the visual information of the vertex (i.e., image) is totally unreliable and the edge weight in the similarity graph is totally decided by the

click session information the traditional *k*-means clustering will fail.
- When we search images sometimes we get duplicates images in initial ranking.

7.Proposed Methodology

In this paper for performing image searching, database of various images will be collected along with the label or text for images. This database will be saved locally for the further process. By using various feature of the database images will be found out, features will be edge map, color map, area, major access length, minor access length and other morphological feature. After that the features evaluated of each and every image along with the search text/ label will be store in the database so that it can be used for future evaluation. Then input text will be taking from user and a series of images also called as image search goal will be presented to the user so that the user can select one of them based on the input images will be retrieved and re-rank based on the features. By duplication detection we are able to focus on enhancing the diversity of re-ranked images. By following all this steps one can evaluate and compared with the existing work.

For getting better user image search goal these are following methods

A new framework that combines image visual information and click session information for inferring user image-search goals for a query. In this way, more precise image-search goals can be achieved.

Two strategies (i.e., the edge reconstruction based strategy and the goal-image-based strategy) to effectively implement the process of combining image visual information with click session information.

To introduce spectral clustering for handling the arbitrary cluster shape scenario during clustering.

The k-NN (k-Nearest Neighbors Algorithm) to find the best matching image. And while for user guidance we are used "User feedback algorithm" to get the user's feedback during searching images on web. Since different queries may have different number of search goals, we further propose a classification risk (CR)-based approach to automatically decide the optimal number of search goals for a query.

8. Conclusion

In this paper we discuss basic introduction about search engines and how it work, and In image searching applications, users are submit queries to search engines to represent what image they needs. However, sometimes queries may not exactly represent users' specific information or goal needs since many ambiguous queries may cover a broad topic and different users may want to get information on different aspects when they submit the same query. For getting relevant image on web image search engine we proposed some methods used in proposed system that is k-NN to fined perfect matching image and k-NN algorithm is among the simplest of all machine learning algorithms. For getting feedback from user, we use user feedback algorithm. Feedback framework has been proposed to handle the insufficient training sample problem for content based image retrieval. The proposed system improves the search engine results by inferring user search goals, removing noisy images, incorrect or limited information problems.

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