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A Survey on Efficient Image Retrieval through User Clicks and Query Semantic Signature

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ABSTRACT: In today's world, most of the commercial search engines like Google, Bing, etc used in order do the effective web based image search. In existing systems, if we enter any textual information, then for a given set of query keywords, pools ofimages get retrieved. In this paper, we have projected a new system where the user can selects a query image from the pool of images; the outstanding images get reranked by referring their visual similarities with respect to query image and semantic signatures. In order to get semantic signatures, the visual features of images are projected into their related semantic spaces. A main challenge in image reranking is to match similarities of visual features with the query image. Recently mechanism has evolved to match images in a semantic space which uses attributes or reference classes which are closely related to the semantic meanings of images as basis. However, learning a universal visual semantic space to describe the distinctive nature of highly diverse images from the web is difficult and incompetent. This paper includes a new image re-ranking framework, which automatically offline learns images in sematic space for user query keywords. This paper work wish to improve both the accuracy and effectiveness of image re-ranking.

KEYWORDS: Query semantic signature, image re-ranking, user clicks, visual feature extraction

I. INTRODUCTION

Most of the search engines use keywords as query to search the images. It is difficult for the users to get target images by only using Keywords as they suffer from the ambiguity of the given query keywords. For example, If we enter "Apple" as a query keyword, then the images gets retrieved from the pool, which fits to this keyword in various categories, like "Apple laptops", "Applefruits","AppleiPhones", "Apple trees", etc. In order to resolve the ambiguity, this novelimage ranking model considers both visual features and click features of the images.This features are simultaneously get utilized to obtain the ranking model [1]. This paper introduces a new image re-ranking framework, which automatically offline learn images in sematic space for user entered keywords. In order to get semantic signatures, the visual features of images are projected into their associated semantic spaces. This query-specific semantic signature expressively improves both the accuracy and effectiveness of image re-ranking [2].Fig.1 shows the general framework of image reranking, as it indicate how the keyword and visual features are get extracted. Once the user select a query image, it will reflects the user's search target from the pool, the remaining images in the pool are re-ranked based on their visual similarities with the query image.

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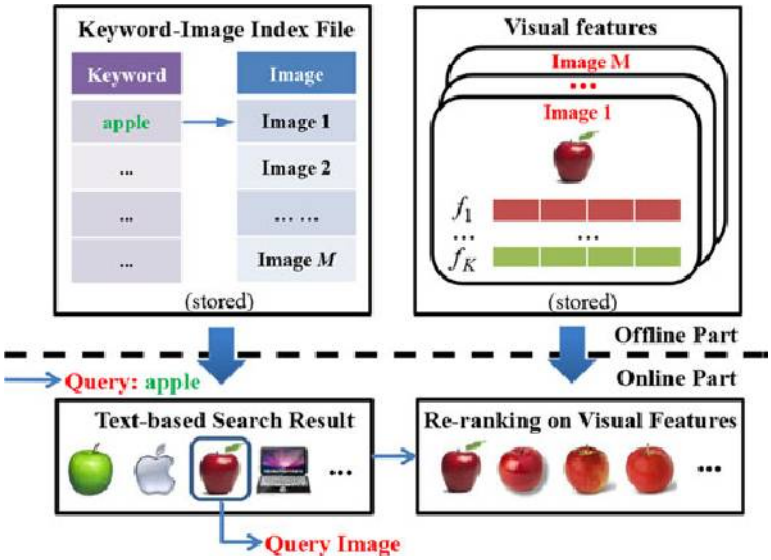

Fig.1 General Image re-ranking framework.

II. LITERATURE SURVEY

In the field of data mining, image reranking is widely adopted concept. In order to extract visual information, we require various parametric information like colour, texture, shape and alphanumeric information i.e. textual information. This textual information is not as trustworthy as equated to visual information. Content based image retrieval i.e.CBIR is an adaptive retrieval approach, which is based on the concept of relevance-feedback, as it forms a link between high-level and low-level features of the images, using the user's feedback [3]. It is mostly suitable for the offline approach. Another scheme i.e. Region based image retrieval (RBIR) is the outline which uses multilabel neighbourhood propagation technique and it can be branded by three key properties: graph construction, multiple low-level labels for each image and multilayer semantic representation i.e. MSR and support vector machine i.e SVM [4]. A very widespread scheme used in the field of 3D object retrieval where it performs first clustering in order to obtain several candidates. Then it select query words for object matching incrementally which is judged based on the labelling information [8]. Another technique is to use relevance feedback; for the given input query keyword, a pool of relevant images fetched by the search engine according to an image index file which is stored in database. The social multimedia tag assigning to images, music, or video clips is possible for common users which provide easy way for the people to generate, manage, and search multimedia resources. A neighbour voting algorithm is effective one which learns tag relevance by gathering votes from visual neighbours under a set of well-defined and convincing assumptions [5].Bayesian visual re-ranking is another mechanism which derives best re-ranking results by exploiting visual consistency while minimizing ranking distance by combing the textual and visual of image [7].

The next Bag-based re-ranking framework was evolved i.e Text Based Image Retrieval (TBIR) for retrieving relevant images based on 'bag' i.e. cluster of same type of images by applying MI learning and classification scheme[9]. Also relevance ranking scheme was developed which estimates the relevance scores of images w.r.t. the query keywords based on both the visual and semantic information of associated tags. And by considering relevance scores and the similarities, the ranking list is get generated, which boost average diverse precision [6][10]. Hyper graph learning-based sparse coding method is another key method which provides image click prediction where it relates the obtained click data to the re-ranking of images [11].

III. MOTIVATION AND OBJECTIVES

Efficient and relevant image retrieval is a big challenge with a growing IT technologies and novel adopted algorithms. As there is inconsistency between textual information and visual features which may generate poor image search results. To resolve this problem, it is good to consider click features of images than the textual information while justifying the relevance between a query and clicked images. This paper involve a new image ranking model which will

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consider user clicks to extract visual features and query semantic signature of image to provide better result for the user query.

This new image reranking model has following objectives:

i) To provide more robust and accurate results, to efficiently solve the independent function.
ii) To improve the search relevance for user query.
iii) To enhance performance of system.
iv) To reduce the time and work of manually selection of images.

IV. EXISTING SYSTEMS

Existing systems of image retrieval is mainly based on the textual information. Also various approaches get used, they are as follow:

A. Text-Based Approach:

The TBIR has been broadly used in image search engines like Google, Bing and Yahoo, etc. In this search engines, user provides input as a keyword or as a textual query and for the same, system returns the ranked relevant images. This ranking score can be obtained according to some similarity measurements between the query keyword and the textual features of the images. A text-based search technique is effective to perform well in textual documents; but may produces somehow mismatch result when applied to the image search.

B. Content-Based Approach:

In Content based image retrieval scheme, user first submit a query image, and retrieval system returns the images that are similar in content. Google is one of the effective search engines that work on content based Image re-ranking. The extracted visual information is natural and independent, which ignores the role of human knowledge in the interpretation process. As the result, a red flower may be regarded as the same as a rising sun, and a fish the same as an airplane etc.

C. Region Based Approach:

In RBIR, each image is first segmented into several regions, and from that regions, features are get extracted. RBIR frequently achieves more satisfactory retrieval performance as it supports both the retrieval technique i.e. “by keyword” and “by region” in image retrieval. Here images can be represented using image encoding i.e. conversion of low level features to keyword index. It uses compact representation which consist of region set and sparse (vector) representation which create N dimensional vectors based on N no. of keywords.

D. Tag Based Approach:

Tag-based image retrieval approach is widely used in some famous search engines Google, Bing,Flickrand Yahoo, to improve the retrieval performance of a group of related personal images which is captured by the same user within a short time period of any event. In TBIR, user enters the inputkeywordasatextualquerytotheretrieval system and thensystemreturnstherankedrelevantimages. It considers both i.e. textual information as well as ranking score. Various algorithms like classification algorithm, neighborhood voting, tag matrix are the most popular algorithms in the field of tag based image retrieval as they states the link between social images and tags and accordingly generates the relevance.

V. PROPOSED SYSTEM

This paper introduces a novel image re-ranking framework which consider both the parameters i.e. keywords and visual features of an images. Visual features are always more reliable than the textual information. This model offline learns the images from the trained data set by taking keyword as input and visual features through single user click (user selected image) and accordingly generate the relevant images. Keyword expansion is allowed in this system.

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This novel image reranking model will works in following ways:

1. User enters the keyword.
2. Pool of images gets generated. Out of that query image is selected by user.
3. For the query image, search engine refers the trained dataset where reference classes present. It will check every feature and generate semantic signatures.
4. At the last it compares semantic signatures of every image, whichever is closer to the query image, is get displayed first and then next image, and so on.

This is possible with the help of one of the efficient algorithm called content based image retrieval algorithm.

CONTENT BASED IMAGE RETRIEVAL (CBIR) ALGORITHM:

CBIR is a method which automatically extracts visual aspects like color, shape, texture and spatial information of each image in the database based on its pixel values. It extracts all low level image features and to some extent it describes the image in a more detail as compared to the text based approach. CBIR works in following way:

1. When user enters the keyword K and selects the query image Qi, Search engine calls the database where trained data set is available.
2. CBIR takes that query image and compared it with the images available in the database and refers the reference classes. (These reference classes can be constructed based on text, shapes, colors, etc.).
3. It calculates the feature vector of query image Qi and generates semantic signature Sj.
4. Based on the well features matching, query images get assigned to specific reference class where semantic signature of all available images gets compared with the semantic signature of query image.
5. Finally, by considering best feature matched, top k relevant images get displayed to the user as an output from the specific reference class.

It is expected that, the offline learning approach will improves accuracy and efficiency in image search. Also gives the faster and relevant result for the user query. Also, precision and recall results will get improved.

E.g. If user enters the apple as a keyword in search engine, then it will first retrieve the images which includes red apple, green apple, apple tree, apple phone, apple laptop,etc. From this pool of images user has to select single image e.g. “Red apple”,then for the next time retrieval system will produce the result in the form of red apple only. This will removes all the ambiguity from the textual information as the search engine uses query keyword and CBIR works with shape, color, and texture.

VI. CONCLUSION

As most of the search engines suffer from ambiguous textual information, which leads to imperfect results. This paper focused on improving image search efficiency by combining textual information and visual information. This novel image reranking model uses visual features, click features, and semantic signature of the images. As a result, it will improve search efficiency, performance, relevance and accuracy.

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