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An Advanced and Efficient Method for Web-Based Image Search Using Semantic Signatures

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Abstract:

Web image search, with one click method is adopted by several commercial searches. Image re- raking approach is taken in account for current web based image search .image re-ranking starts with the intake of query keyword and search engine do first retrieve images according to the keyword given. The user now selects an image from the group retrieved and the images will be re-ranked according to users one click. The major challenge is the image with similar visual features cannot be correlated by which the user clicks. Learning of a universal visual semantic Space which depicts the characteristics of images which are highly different to each other is also a difficult task.

Thus the proposed Approach to overcome the problem is an image re-ranking framework. It has the property of Automatic offline learning. It learns different visual semantic spaces for different query keyword. Thus a semantic signature will be produced by projecting visual features of images to their visual semantic space. At its online stage the produced semantic signature is compared with the images so that images get re-ranked as the semantic signature is obtained from keywords visual semantic space. As a result the proposed image re-ranking framework thus increases accuracy and efficiency of image re-ranking.

Index Terms:

Query keyword, re-ranking, semantic signature, visual semantic space.

I. INTRODUCTION:

Web image retrieval starts with keyword queries and the major challenge is that ambiguity in query keyword specified by user. Ambiguity in query keyword produces noisy image search result.[1]For example when “apple” used as keyword, the image retrieved will fall on different category, apple of different shapes, colour etc.Thus image re-ranking methodology has been adopted for better search results.it starts with an intake of a query keyword and a set of images being retrieved then the user selects an image of search intention. The rest images will be re-ranked according to the selected image visual features.

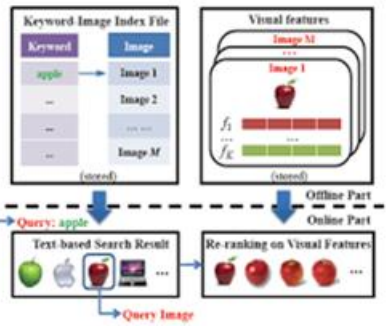

Fig 1. The conventional image search framework

The problem in image re-ranking is that images having similar low level visual features cannot be correlated with the higher level semantic meaning of image selected by the user. For example if a user search for keyword “apple” the result may of “green apple”, “red apple” etc. if the user then clicks to “red apple” images should be re –ranked according to the semantic of image, not only its low visual features.ie image should be all of ”red apple”no images similar by low visual

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features and diverse in semantics should not be retrieved. The other challenge is that it is hard to learn a universalvisual semantic space for characterizing highly diverse images as the image database grow big in web.The conventional image search framework is shown in fig 1.

II. RELATED WORK:

For different query images, the effective low-level visual features are different. Therefore, Cui et al. [6], [7] classified query images into eight predefined intention categories and gave different feature weighting schemes to different types of query images. But it was difficult for the eight weighting schemes to cover the large diversity of all the web images. It was also likely for a query image to be classified to a wrong category. . Hsu et al. [15] used the Information Bottleneck (IB) principle to maximize the mutual information between search relevance and visual features. Krapac et al. [26] introduced generic classifiers based on query-relative features which could be used for new query keywords without additional training. Jing and Baluja [21] proposed VisualRank to analyze the visual link structures of images and to find the visual themes for reranking. Lu et al. [31] proposed the deep context to refine search results. Cai et al. [32] re-ranked images with attributes which were manually defined and learned from manually labeled training samples.

III. SYSTEM ARCHITECTURE:

The proposed system consist of a framework for image re-ranking.it have the capability to learn different visual semantic spaces for different query keywords the learning process is done automatically and it does not keep a universal concept dictionary. the query keyword itself helps in narrowing semantic space of images that are to be re-ranked.for example the keyword is “blackberry” the concepts like “cars”,”bikes” can be avoided and concepts like “mobile phone”,”fruit”can be taken in account. These relevant concept can be made use for learning visual semantic space of “blackberry”, thus the nonrelavent concept can be avoided and the visual semantic space will be accurately modeled. Those nonrelavant concepts will be always noisy and it takes the accuracy of re-ranking down. The next stage is that the visual features of images will get projected to their respective visual semantic spaces and the produced output will be semantic signatures. This produced semantic signature of the given query keyword will be compared with other images and are re-ranked. Proposed system architecture is shown in fig2.

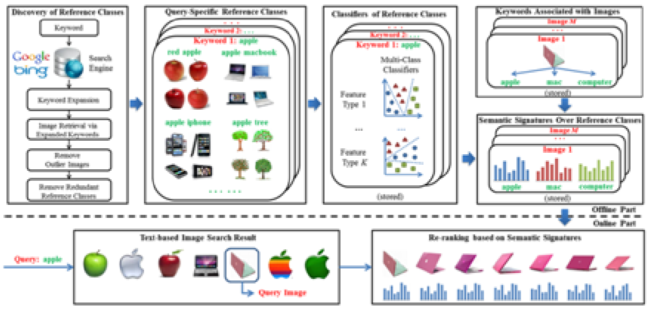

Fig 2. System Architecture

it consist of two phases named online and offline.in the offline stage for a query keyword “blackberry” the most relevant concept that matches the keyword will be automatically selected. concepts like “fruit”,”mobile phone” are selected as relevant concept by considering visual and textual i information a reference class is developed, which contains a set of keyword expansion. For the automatical obtaining of training examples these relevant concept (“fruit”) is used to retrieve images. Thus the retrieved images by keyword expansion will have less difference with images retrieved by query keyword “blackberry”. this stage also performs removal of noisy data and also redundant reference class. For example “blackberry mobile”, “blackberry mobile models” comes under same reference class. Every query keyword will have a multiclass classifiers on low level visual features stored. Each image in the database will be relevant to different keyword according to word image index file. Now we have an multiclass classifier of reference class and word image index file. The visual features of image and reference class of keyword is compared using classifiers which are stored earlier.

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And thus the semantic signature is extracted. Now at the frameworks online stage user inputs the query keyword.as all images in the database will have its own semantic signature will be retrieved first. Now the user clicks on his intent image, its semantic signature will be compared with semantic signature of other images and image search result will be re-ranked. The semantic signature developed has the property to project thousand dimensions of original visual features in to twenty-five dimensions. Thus it improves the result of web image re-ranking. It has the advantage that the visual features of similar images can be correlated to the semantic meaning of image which user selects.

IV. DISCOVERY OF REFERENCE CLASSES:

A. Keyword Expansion:

For a keyword „q" its reference class can be determined by a set of expansion of „q".ie S(q) which is more similar to"q" and is the super set of „q".To find the reference class ,a set of images I(q) is retrieved taken „q" as query keyword. The retrieved images will be linked with different words .these words makes „k" the keyword expansion and „k" € S(q)will appear in I(q).[6]

B. Training Images of Reference Class:

Training images of reference class is obtained automatically. The process is that the result from the keyword expansion "k" is taken as query keyword and top „m" images are taken as training images. The keyword expansion „k" will have less ambiguity to „q" semantically to retrieved images will not be highly divers to each other.

C. Redundant Reference Classes:

Keyword expansion of "blackberry "as "blackberry mobiles "and "blackberry mobile models" are both visually and semantically same. To identify these kinds of redundant classes half of the data in both class is taken and SVM classifier is used to classify next half. If it is possible to classify both half easily then it is proven that both classes are not the same.

V. MODULES AND ALGORITHM:

1. Login Module**:** In this module, Users are having authentication and security to access the detail which is presented in the ontology system. Before accessing or searching the details user should have the account in that otherwise they should register first. Registration-In this module if a user wants to access the data which is stored in a cloud server, he/she should register their details first. These details are maintained in a Database. If a User have to register first, then only he/she has to access the data base. Login-In this module, any of the above mentioned person have to login, they should login by giving their username and password

Home Page:

Fig 3 Home page

Home page is the initial page in our project, here in this page we can see five tabs those are home, about us, admin login, user login, contact us. Here we describe the project summary in this page.in fig 3

User Login Page:

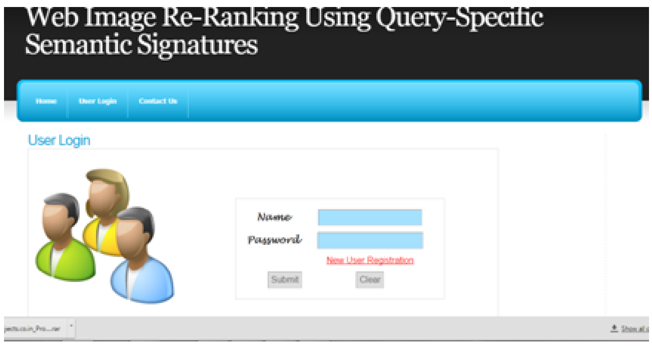

Fig 4 User login page

This is for user login form for providing the authentication on username and password .It verifies

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the data from Database. Shown in fig 4. 2. Admin Module: In this module, admin can view the user details and also view the registered user in the database. Administration modules interpret the model by way of a special configuration file which can be altered to extend all the generated components and the module look and feel. Such modules benefit from the usual module mechanisms described in previous chapters (layout, routing, custom configuration, auto loading, and so on). You can also override the generated action or templates, in order to integrate your own features into the generated administration, but should take care of the most common requirements and restrict the use of java code only to the very specific. This is for user login form for providing the authentication on username and password .It verifies the data from Database. Shown in fig 5.

Admin Login Page:

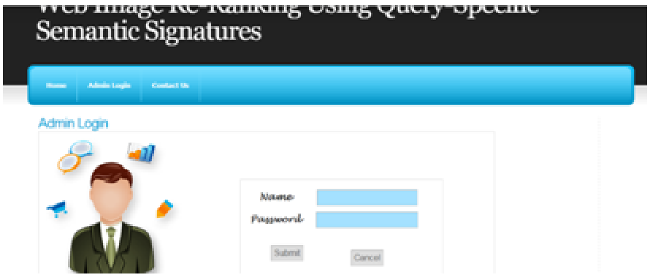

Fig 5. Admin Login page

Fig 6 Admin page

In this admin page we have view users, view images, view report, logout tabs. Admin can add the images to the database from this page. Shown in fig 6.

View Users Page:

Fig 7 View user's page

It display the users profile information to the admin. Shown in fig 7

View Image Page:

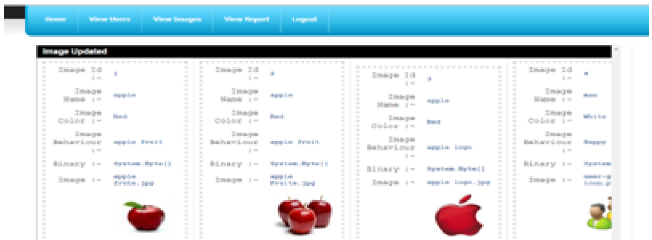

Fig 8 View image page

It displays all the information of the image s like id, color, name, etc. Shown in fig 8

Fig 9 View report page

3. Text Based Image Search:

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

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information. The xml page will be consisted of built-in and user defined tags our practical results showing that proposed approach taking very less time to answer the queries while providing more accurate information. The text based image search page is shown in fig 10.

Text Based Image Search Page:

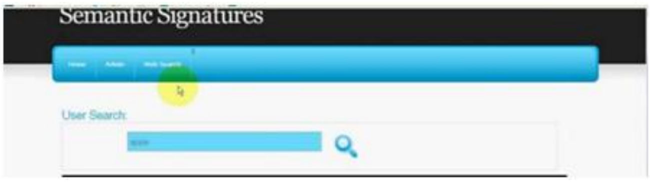

Fig 10 Text Based Image Search Page

4. Image Re-Ranking on One Click:

The user first submits query keywords q. A pool of images is retrieved by text-based search. Then the user is asked to select a query image from the image pool. The query image is classified as one of the predefined adaptive weight categories. Images in the pool are re-ranked based on their visual similarities to the query image and the similarities are computed using the weight schema specified by the category to combine visual features. In the keyword expansion step words are extracted from the textual descriptions (such as image file names and surrounding texts in the html pages) of the top k images most similar to the query image, and the tf-idf method is used to rank these words. To save computational cost, only the top m words are reserved as candidates for further processing. However, because the initial image reranking result is still ambiguous and noisy, the top k images may have a large diversity of semantic meanings and cannot be used as visual query expansion. Shown in fig 11.

Fig 11 Image Re-Ranking on One Click

5. Image 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. The results are shown. It still greatly outperforms the approaches of directly comparing visual features. This result can be explained from two aspects. The multiple semantic signatures obtained from different types of visual features separately have the capability to characterize the visual content of images outside the reference classes. Many negative examples (images belonging to different categories than the query image) are well modelled by the reference classes and are therefore pushed backward on the ranking list.

6. Contact Us: In this module we will have the contact details of the admin. In fig 12

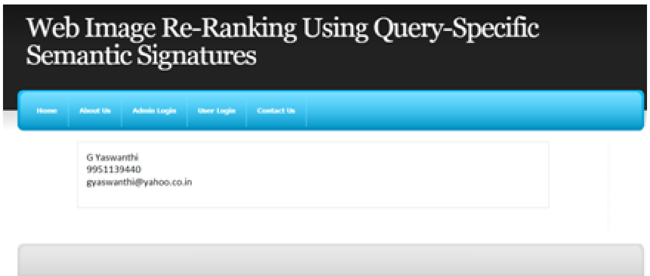

Fig 5.12 Contact us page

ALGORITHM:

1. There are 2 parts online and offline.
2. In offline stage reference classes representing different concepts related to query keywords are automatically discovered. For a query keyword (e.g. “apple”), a set of most relevant keyword expansions (such as “red apple” and “apple MacBook”) are automatically selected utilizing both textual and visual information.
3. Set of keyword Expansions define reference classes for different keywords.
4. A multi class classifier is trained on training set of reference classes.
5. If there are k types of visual and textual features like color, shape, texture we can combine them to train single classifier.

6. At online stage pool of images are retrieved according to query keyword. Once user chooses query image semantic signatures are used to compute similarities of image with precomputed semantic signatures.

VI. CONCLUSION AND FUTURE WORK:

The framework for web image re-ranking based on query specific semantic signature improves the method of web image re-ranking. It uses semantic signature which is produced by projecting visual features of images to their visual semantic space. The semantic signature which is obtained from keywords and user intent image semantic space will be compared to the semantic signature of other images at online stage. So that images will be re-ranked .thus it increases the accuracy and efficiency of web image re-ranking. Future improvements-This System being web-based and an undertaking of Cyber Security Division, needs to be thoroughly tested to find out any security gaps. Improve better image re-ranking by using advanced clustering algorithms and apply these techniques on video ranking also. We can extend proposed method to incorporate visual appearance coherence by using IB (Information Bottleneck) clusters not only preserve information about search relevance but also describe the part of the visual appearance in every preview session of view.

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