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A New Trend Content-Based Image Retrieval Technique used in Real Time Application

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Abstract— Content-based image search on the Internet is a challenging problem, mostly due to the semantic gap between low-level visual features and high-level content, as well as the excessive computation brought by huge amount of images and high dimensional features. In this paper, we present iLike, a new approach to truly combine textual features from web pages, and visual features from image content for better image search in a vertical search engine. We tackle the first problem by trying to capture the meaning of each text term in the visual feature space, and reweight visual features according to their significance to the query content. Our experimental results in product search for apparels and accessories demonstrate the effectiveness of iLike and its capability of bridging semantic gaps between visual features and abstract concepts.

Keywords— CBIR, RF, QBIC, Image retrieval, Vertical search etc.

I. INTRODUCTION

With the Internet explosion, tremendous amounts of multimedia information, such as images, videos, and ashes, become available on the Web. Unlike the great Success of text based web search, the research community is still struggling with content-based indexing and searching of multimedia information over the Internet. Image search engines still rely on text-based methods, i.e. retrieve and rank images based on surrounding text or human-submitted annotations. On the other hand, most existing content-based image retrieval (CBIR) prototypes still use offline image databases that are not comparable with the scale of the Web. Besides various research efforts that aim to directly employ visual content Permission to make digital or hard copies of all or part of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. To copy otherwise, to republish, to post on servers or to redistribute to lists, requires prior specific permission and/or a fee. It's based retrieval for Web images, some recent approaches have proposed alternative routes We take a different approach, which focuses on truly integrating textual and visual features for vertical search engines. A vertical search engine, a.k.a. niche search engine, is a domain-specific search engine that works on a smaller sub graph of the Web. Examples of vertical search include scientific publications search (e.g. Google Scholar, CiteSeer), product search (e.g. Google Product, Yahoo! Shopping), Blog search, source code search, local search, etc. Vertical search engines have shown better performance than general Web search engines (e.g. precision, ranking), because they are more focused and optimized with domain knowledge .

In the scenario of vertical search, we have a better chance to truly integrate visual features from images and textual features from text contents. First, text contexts are better organized, hence focused crawlers/parsers are able to generate data patterns and structured data, instead of free text .Second, we are able to associate text content with images with high confidence. In general Internet image retrieval, one problem is that texts surrounding images may not necessarily describe the image content. However, in some vertical search engines, the focused crawlers are able to connect text contents with corresponding image(s), e.g. product images and product descriptions, paintings and introductions, etc. Third, with the knowledge of the focused domain, we are able to select image features and similarity measures that are more effective for the domain. Finally, computation issues become less critical for a smaller data set. In this paper, our goal is to explore the possibilities of integrating visual and textual features to improve search performance in the scenario of vertical search. Particularly, we focus on the domain of product search for apparels and accessories. In this domain, we propose to utilize both textual features (from product description) and visual features (from product images) for items, and try to understand and mimic human perception of \similarity" .More specifically, we try to understand the inherent connections between text (keywords) and visual features, to build a bridge over the semantic gap. We start from predicting user intention, which is implicitly carried with search terms. For instance, the query \blue shirt" indicates that the user concern more on color than any other aspect.

However, such clearly expressible intention is not available for all the terms, and such human perception is yet to be mapped to low-level feature spaces. We further assess the perception/intention behind each keyword in the visual feature

space, and use them for searching as well as reweighting visual features according to their significance to the query. These novel ideas allow us to integrate textual and visual features in accordance with user perception, and develop a similarity measure and ranking method that better its user intention. Our major contributions are three-fold: we demonstrate that truly integrating textual and visual features could significantly improve ranking in vertical search, especially in the domains where visual contents are equally significant to text contents. It also improves overall recall by yielding items that would otherwise be missed by searching with either type of the features. (2) We are able to infer users'(visual) intention behind search terms, and apply such intention to improve relevance assessment and ranking through textual-feature-guided visual feature selection and weighting.(3) Our approach also assesses representations of keywords in the visual feature space, and computes the semantic relationships of the terms. In this way, we are able to automatically generate a thesaurus based on the \visual semantics of words. To retrieve images, users provide the retrieval system with example images or sketched figures.

CBIR involves the following four parts in system realization: data collection, build up feature database, search in the database, arrange the order and deal with the results of the retrieval.

1) Data collection:-Using the Internet spider program that can collect webs automatically to interview Internet and do the collection of the images on the web site, then it will go over all the other webs through the URL, repeating this process and collecting all the images it has reviewed into the server. 2) Build up feature database using index system program do analysis for the collected images and extract the feature information. Currently, the features that use widely involve low level features such as colour, texture and so on, the middle level features such as shape etc. 3) Search the Database The system extract the feature of image that waits for search when user input the image sample that need search, then the search engine will search the suited feature from the database and calculate the similar distance, then find several related webs and images with the minimum similar distance. 4) Process and index the results after researching Index the image obtained from searching due to the similarity of features, then return the retrieval images to the user and let the user select. If the user is not satisfied with the searching result, he can re-retrieval the image again, and searches database again.

II. RELATED WORK

A. Color Based Retrieval

Color feature is the most intuitive and obvious feature of the image, and generally adopt histograms to describe it. Color histograms method has the advantages of speediness, low demand of memory space and not sensitive with the images' changes of the size and rotation, it wins extensive attention consequently.

B. The retrieval based on texture feature

When it refers to the description of the image's texture, we usually adopt texture's statistic feature and structure feature as well as the features that based on special domain are changed into frequency domain.

C. The retrieval based on shape feature

There is three problems need to be solved during the image retrieval that based on shape feature. Firstly, shape usually related to the specifically object in the image, so shape's semantic feature is stronger than texture.

D. Intent Search: Capturing User Intention for One-Click Internet Image Search

Web-scale image search engines (e.g., Google image search, Bing image search) mostly rely on surrounding text features. It is difficult for them to interpret users' search intention only by query keywords and this leads to ambiguous and noisy search results which are far from satisfactory. It is important to use visual information in order to solve the ambiguity in text-based image retrieval. In this paper, we propose a novel Internet image search approach. It only requires the user to click on one query image with minimum effort and images from a pool retrieved by text-based search are re ranked based on both visual and textual content. Our key contribution is to capture the users' search intention from this one-click query image in four steps. 1) The query image is categorized into one of the predefined adaptive weight categories which reflect users' search intention at a coarse level. Inside each category, a specific weight schema is used to combine visual features adaptive to this kind of image to better re rank the text-based search result.2) Based on the visual content of the query image selected by the user and through image clustering, query keywords are expanded to capture user intention. 3) Expanded keywords are used to enlarge the image pool to contain more relevant images. 4) Expanded keywords are also used to expand the query image to multiple positive visual examples from which new query specific visual and textual similarity metrics are learned to further improve content-based image re ranking. All these steps are automatic, without extra effort from the user. This is critically important for any commercial web-based image search engine, where the user interface has to be extremely simple. Besides this key contribution, a set of visual features which are both effective and efficient in Internet image search are designed. Experimental evaluation shows that our approach significantly improves the precision of top-ranked images and also the user experience.

E. Real Time Google and Live Image Search Re-ranking

Nowadays, web-scale image search engines (e.g. *Google Image Search*, *Microsoft Live Image Search*) rely almost purely on surrounding text features. This leads to ambiguous and noisy results. We propose to use adaptive visual similarity to re-rank the text based search results. A query image is first categorized into one of several predefined intention categories, and a specific similarity measure is used inside each category to combine image features for re-ranking based on the query image. Extensive experiments demonstrate that using this algorithm to filter output of *Google Image Search* and *Microsoft Live Image Search* is a practical and effective way to dramatically improve the user experience. A real time image search engine is developed for on-line image search with re-ranking.

F. Image Retrieval From the World Wide Web: Issues, Techniques, and Systems

With the explosive growth of the World Wide Web, the public is gaining access to massive amounts of information. However, locating needed and relevant information remains a difficult task, whether the information is textual or visual. Text search engines have existed for some years now and have achieved a certain degree of success. However, despite the large number of images available on the Web, image search engines are still rare. In this article, we show that in order to allow people to profit from all this visual information, there is a need to develop tools that help them to locate the needed images with good precision in a reasonable time, and that such tools are useful for many applications and purposes. The article surveys the main characteristics of the existing systems most often cited in the literature, such as Image Rover, WebSeek, Diogenes, and Atlas WISE. It then examines the various issues related to the design and implementation of a Web image search engine, such as data gathering and digestion, indexing, query specification, retrieval and similarity, Web coverage, and performance evaluation. A general discussion is given for each of these issues, with examples of the ways they are addressed by existing engines, and 130 related references are given. Some including remarks and directions for future research are also presented.

III. IMPLEMENTATION DETAILS

The system then changes these examples into its internal representation of feature vectors. The similarities /distances between the feature vectors of the query example or sketch and those of the images in the database are then calculated and retrieval is performed with the aid of an indexing scheme. The indexing scheme provides an efficient way to search for the image database. Fig 1 shows recent retrieval systems have incorporated users' relevance feedback to modify the retrieval process in order to generate perceptually and semantically more meaningful retrieval results.

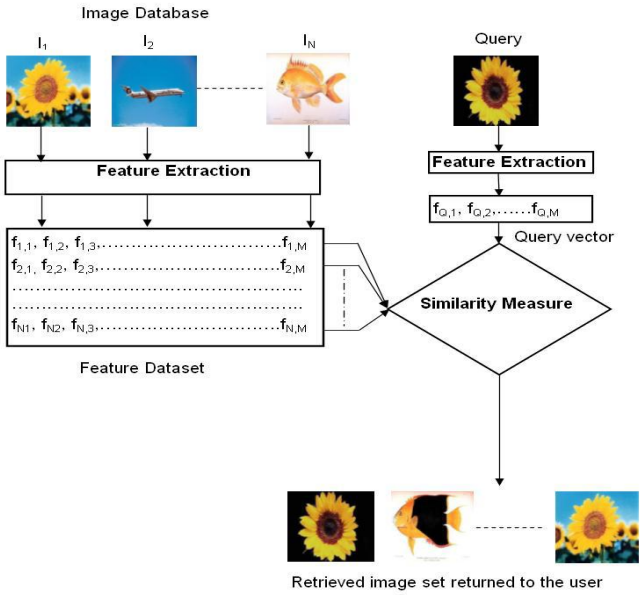

Fig.1 Relevance Retrieve System

Once a decision on the visual feature set choice has been made, how to steer them towards accurate image retrieval is the next concern. There has been a large number of fundamentally different frameworks proposed in the last few years. A semantics sensitive approach to content-based image retrieval has been proposed in a semantic categorization (e.g., graph photograph, textured and non textured) for appropriate feature extraction followed by a region based overall similarity measure, allows robust image matching. An important aspect of this system is its retrieval speed.

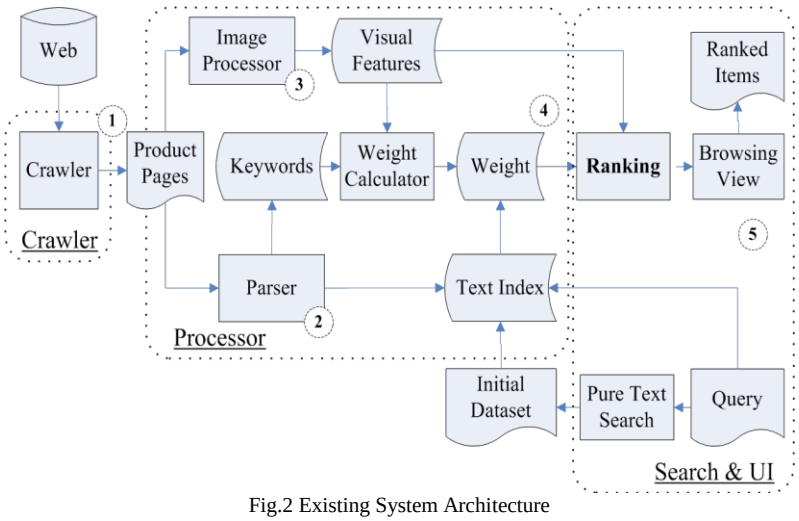

Fig.2 Existing System Architecture

Above Fig shows, most existing content-based image retrieval (CBIR) prototypes still use online image databases that are not comparable with the scale of the Web. A vertical search engine, a.k.a. niche search engine, is a domain-specific search engine that works on a smaller sub graph of the Web. To explore the possibilities of integrating visual and textual features to improve search performance in the scenario of vertical search, aim to integrate textual and visual features for better search performance. Our experimental results in product search for apparels and accessories demonstrate the effectiveness of iLike and its capability of bridging semantic gaps between visual features and abstract concepts. That aim to directly employ visual content based retrieval for Web images, some recent approaches have alternative routes, take a different approach, which focuses on truly integrating textual and visual features for vertical searchengines.To explore the possibilitiesof integrating visual and textual features to improve.search performance in the scenario of vertical searchTo tackle such problems, alternative approacheshave been proposedto apply CBIR in vertical search. The current version of iLike has demonstrated outstanding performance for a large number of descriptive terms. It does not work well for some keywords (mostly non-adjectives). We are able to infer the implicit user intension behind the query term, identify a subset of visual features that are significant to such intension, and yield better results.

IV. CONCLUSIONS

In this paper, we introduced some fundamental techniques for content-based image retrieval, including visual content description, similarity/distance measures, indexing scheme, user interaction and system performance evaluation. Our emphasis is on visual feature description techniques. Details of indexing of high-dimensional features, user relevance feedback, and semantic description of visual contents will be addressed .General visual features most widely used in content-based image retrieval are color, texture, shape, and spatial information. The future of this field depends on the collective focus and overall progress in each aspect of image retrieval, and how much the ordinary individual stands to benefit from it. Also we have studied implementation of CBIR technology in real time application. The application areas most likely to benefit from the adoption of CBIR are those where techniques can be directly applied. Trademark image searching is an obvious example while the technology of shape retrieval may not be perfect; it is already good enough to be useful in a commercial environment. Other areas where retrieval by primitive image feature is likely to be beneficial are crime prevention (including identification of shoe print as well as faces and fingerprints.)

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