

A Survey on Tag Based Image Search Using Various Aspects

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ABSTRACT

Day by day the amount of mobile devices and web services are increasing rapidly and the success of many online social media websites, which allow users to create and share media information such as images and videos as well as describe the media content with tags. Social media sharing websites like "Flickr" allow users to annotate images or pictures with free tags, which significantly support to the development of the web image retrieval and organization. Tag-based image search is an important method to find images contributed by social users in such social websites. However, how to make the top-high ranked result relevant and with diversity is challenging. In this project, we propose a social re-ranking system for tag-based image retrieval with the consideration of image's relevance and diversity. We focus at re-ranking images according to their visual and semantic information and social clues. The initial results include photos contributed by different social users. Usually each user contributes several images. First we sort out these images by inter-user re-ranking. Users that have higher contribution to the given query rank higher. Then we gradually implement intra-user re-ranking on the ranked user's image set and only the most relevant image from each user's image set is selected. These images compose the final retrieved results. We make an inverted index structure for the social image dataset to accelerate the searching process. Experimental results on "Flickr" dataset show that our social re-ranking method is effective and efficient.

Keyword: - Social media, Tag-based image retrieval, Social clues, Image search, Re-ranking.

1. INTRODUCTION

With the spread of Web 2.0, (the second stage of development of the Internet, characterized especially by the change from static web pages to dynamic or user-generated content and the growth of social media.) photo-sharing services are hosting a tremendous volume of digital images associated with their users' generated tags. This phenomenon has brought great challenges to multimedia storage, retrieval and indexing. Generally speaking, tag-based image search is commonly used in social media than content based image retrieval [9] and context-and-content based image retrieval [10]. In recent years, the re-ranking problem in the tag-based image retrieval has gained researchers' wide attention.

Nonetheless, the following challenges block the path for the development of re-ranking technologies in the tag-based image retrieval.

1) Tag mismatch. Social tagging requires all the users in the social network to label their uploaded images with their own keywords and share with others. Different from ontology based image annotation there is no predefined ontology or taxonomy in social image tagging. Every user has his own habit to tag photos. Even for the same image, tags contributed by different users will be of great difference. Thus, the same image can be interpreted in several ways with several different tags according to the background behind the image. Thus, many seemingly irrelevant tags are introduced.

2) Query ambiguity. Users cannot precisely describe their request with single words and tag suggestion system always recommend words that are highly correlated to the existing tag set, thus add little information to a users' contribution. Besides, polysemy and synonyms are the other region of the query ambiguity. Thus, a fundamental problem in the re-ranking of the tag-based social image retrieval is how to reliably solve these problems. As far as the "tag mismatch" problem is concerned, tag refinement [7, 2,], tag relevance ranking and image relevance ranking approach [8, 11] have been dedicated to overcome this problem. As for the 'query ambiguity' problem, an effective approach is to provide diverse retrieval results that cover multiple topics underlying a query. Currently, image clustering [12] and duplicate removal [13] are the major approaches in settling the diversity problem. However, the essence of social images is ignored. The social images uploaded and tagged by users are user-oriented.

3) These user-oriented photos which share the same user and tagged with same query are always taken in a fixed time interval at a specific spot. It is well-known that, images taken in the same time interval and fixed spot are fairly similar. To diversify the top ranked search results, it's better to re-rank the results by removing the duplicate images from the same user.

4) Starting from this intuition and above analysis, we propose a social re-ranking algorithm which user information is firstly introduced into the traditional ranking method considering the semantics, visual information and social clues of images.

The contributions of this paper can be described as follows:

- 1) We propose a tag-based image search approach with social re-ranking. We systematically fuse the visual information, social user's information and image view times to boost the diversity performance of the search result.
- 2) We propose the inter-user re-ranking method and intra-user re-ranking method to achieve a good trade-off between the diversity and relevance performance. These methods not only reserve the relevant images, but also effectively eliminate the similar images from the same user in the ranked results.
- 3) In the intra-user re-ranking process, we fuse the visual semantic and views information into a regularization framework to learn the relevance score of every image in each user's image set. To speed up the learning speed, we use the co-occurrence word set of the given query to estimate the semantic relevance matrix.

2. LITERATURE SURVEY

A. L. Chen, S. Zhu, Z. Li. "Image retrieval via improved relevance ranking." In Control Conference, pp. 4620-4625, IEEE, 2014.

Recent years have witnessed the success of online social media websites. Social images are usually related with user-provided descriptors called tags, and thus tag-based search can be easily accomplished by using the descriptors as index terms. However the existing methods frequently return results that are noisy or irrelevant with low-quality. It is argued that the relevance and quality are two important measures for a user friendly explaining the returned images. In this paper, we propose a relevance-quality ranking method considering both image relevance and image quality. First, a relevance-based ranking scheme is utilized to automatically rank photos according to their relevance to the query tag, which reckons the relevance scores based on both the visual similarity of images and the semantic consistency of related tags. Then, quality scores are added to the

candidate ranking list to accomplish the relevance-quality based ranking. Experimental results on NUS-WIDE image collection demonstrate the effectiveness of the proposed approach.



Fig -1: Some examples from NUS-WIDE database

B. Y. Yang, Y. Gao, H. Zhang, J. Shao. Image Tagging with Social Assistance. In Proceedings of International Conference on Multimedia Retrieval (p. 81), ACM, 2014.

Image tagging, also known as image annotation and image conception detection, has been extensively studied. However, most existing approaches can hardly achieve satisfactory performance owing to the deficiency and unreliability of the manually-labelled training data. In this section, we present a new image tagging scheme, termed Social Assisted Media Tagging (SAMT), which leverages the abundant user-generated images and the associated tags as the ‘social assistance’ to learn the classifiers. We aim on addressing the following major challenges, (a) the noisy tags associated to the web images and (b) the desirable robustness of the tagging model. We present a joint image tagging framework which simultaneously corrects the erroneous tags of the web images as well as learns the reliable image classifiers. In particular, we devise a novel tag refinement module for eliminating and identifying the noisy tags by substantially exploring and preserving the low-rank nature of the tag matrix and the structured sparse property of the tag errors. We develop a robust image tagging module based on the $\ell_{2,p}$ -norm for learning the reliable image classifiers. The correlation of the two modules is well explored within the joint framework to make advance each other. Extensive experiments on two real-world social image databases illustrate the superiority of the proposed approach as compared to the existing methods.

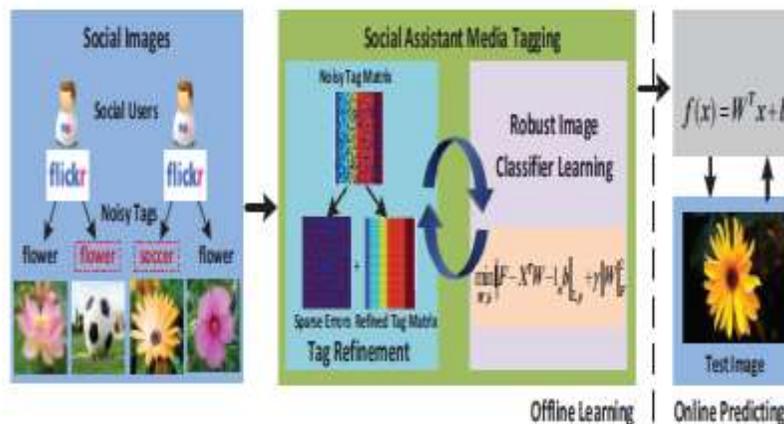


Fig -2: Flow chart of the proposed SAMT framework

- C. A. Ksibi, AB. Ammar, CB. Amar. Adaptive diversification for tag-based social image retrieval. International Journal of Multimedia Information Retrieval, 2014, 3.1: 29-39.**

With the great popularity of social photos sharing websites, a tremendous volume of digital images is hosted together with their associated tags. Thus extensive research efforts have been dedicated to tag-based social image search which allow users to formulate their queries using tags. However, tag queries are often typically short and ambiguous. Diversifying search results is a solution in the absence of further knowledge about the user's intention. Such approach aims to retrieve relevant images covering as much of the diverse meanings the query may have. However not all queries are uniformly ambiguous and hence various diversification strategies might be suggested. In such a context, two new processes are jointly investigated at query post-processing and pre-processing levels. On the one hand, we propose a multi-view concept-based query expansion process, using a predefined list of semantic concepts, which focus to weight concepts from different views or contexts, aggregate the obtained weights and select the most representative ones using a dynamic threshold. On the other hand, we propose a new ranking process method called 'adaptive diverse relevance ranking' which automatically predicts an effective trade-off between relevance scores and diversity scores according to the query ambiguity level. Thorough experiments using 12 ambiguous queries over the (NUS-WIDE) dataset show the effectiveness of our approach versus classical uniform diversification approaches.

- D. Y. Gao, M. Wang, H. Luan, J. Shen, S. Yan, and D. Tao. Tag-based social image search with visual-text joint hypergraph learning. Proceedings of the ACM International Conference on Multimedia information retrieval, 2011:1517-1520.**

Tag-based social image search has attracted great interest and how to order the search results based on relevance level is a research problem. Visual content of images and tags have both been investigated. However existing methods mostly employ tags and visual content separately or sequentially to learn the image relevance. This paper proposes a tag-based image search with visual text joint hyper graph learning. We simultaneously investigate the bag-of-words and bag-of-visual-words representations of images and accomplish the relevance estimation with a hyper graph learning approach. Each visual word or textual generates a hyper edge in the constructed hyper graph. We conduct experiments with a real-world data set and experimental results demonstrate the effectiveness of our approach.

- E. K. Yang, M. Wang, X. Hua, and H. Zhang. Social Image Search with Diverse Relevance Ranking. Proceedings of the IEEE International Conference on Magnetism and Magnetic Materials, 2010:174-184.**

We have witnessed the popularity of image-sharing websites for sharing personal experiences through photos on the web. These websites allow users illustrate the content of their uploaded images with a set of tags. However, the existing ranking approaches for tag-based image search frequently return results that are lack or irrelevant of diversity. This paper proposes a diverse relevance ranking scheme which is able to simultaneously take relevance and diversity into account. It takes advantage of both the content of images and their related tags. First, it estimates the relevance scores of images with respect to the query term based on both the semantic information and the visual information of images of associated tags. Then we mine the semantic similarities of social images based on their tags. With the relevance scores and the similarities, the ranking list is generated by a greedy ordering algorithm which optimizes Average Diverse Precision (ADP), a novel measure that is extended from the conventional Average Precision (AP). Comprehensive experiments and user studies demonstrate the effectiveness of the approach.

- F. M. Wang, K. Yang, X. Hua, and H. Zhang. Towards relevant and diverse search of social images. IEEE Transactions on Multimedia, 12(8):829-842, 2010.**

Recent years have witnessed the great success of social media websites. Tag-based image search is an important approach to accessing the image content on these type o websites. However the existing ranking methods for tag-based image search frequently return results that are irrelevant or not diverse. This paper present a diverse relevance ranking scheme that is able to take diversity and relevance into account by exploring the content of images and their associated tags. First, it estimates the relevance scores of images with respect to the query term based on both the semantic information and the visual information of images of associated tags. Then, we estimate the semantic similarities of social images based on their tags. Based on the similarities and the relevance scores, the ranking list is generated by a greedy ordering algorithm which optimizes average diverse precision, a novel measure that is extended from the conventional average precision. Comprehensive experiments and user studies demonstrate the effectiveness of the approach. We also apply the scheme for web image search re-ranking, and it is shown that the diversity of search results can be enhanced while maintaining a comparable level of relevance.

3. CONCLUSIONS

In this survey, we analyzed various social re-ranking methods for tag-based image retrieval. In this social re-ranking method, inter-user re-ranking and intra-user re-ranking are survey is also carried out to obtain the retrieved results. In order to improve the diversity performance, user information is firstly introduced into our proposed approach and obtains satisfactory results. Besides views of social image is also firstly fused into a traditional regularization framework to improve the relevance performance of retrieved results. Discussions and experiments have demonstrated that our proposed method is effective and time-saving.

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