

International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: www.ijirset.com

Vol. 6, Issue 7, July 2017

Tag Based Image Retrieval by Social Re-Ranking Mechanism

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ABSTRACT: Social media sharing sites such as Flickr allow users to define free image tags, contributing significantly to the development of the retrieval and organization of web images. Finding images by tag is an important visualization image viewed by social users on social web site approach. So, as ranked higher ranked results and diversity is a challenge. In this article we present a social re-ranking system for image retrieval based on keyword considering the image's relevance and variance. Our goal is to re-rank images based on their visual information, semantic information, and social results, that is to say, to see the particular image account. The first results are images displayed by different social users of that system. Typically, each user provides multiple images. So, we first ordered these images through an inter-user ranking process. Users who have a major contribution to the consultation have given a higher rank. Then we sequentially implement intra-user re-ranking into the user classified image set, and only the related image set of each user is selected for further processing. These groups include selected images retrieved final results. We produce an inverted index structure for all social image data to speed up the search process.

KEYWORDS: Social Media, Tag-based Image Retrieval, Social Clues, Image search, Re-ranking

I. INTRODUCTION

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

1) No matching keyword. Social tagging requires all social network users to tag their uploaded images with their own keyword images and share them with others. Unlike the ontology-based image annotation; there is no predefined ontology or social image encoding taxonomy. Every user has their own custom of tagging images. Also for the same image, tag made by different users will be very different. Therefore, the same image can be interpreted in various ways with various different tags depending on the background behind the image. Therefore, many seemingly irrelevant tags are introduced.

2) The query ambiguity. Users can not accurately describe your request with just words and tags suggestion system always recommending words that are highly correlated with the current set of tags, so they provide little information to a user's contribution. In addition, polysemy and synonyms are the other causes of query ambiguity.

Therefore, a fundamental problem in the re-classification tag based on social image recovery is the way to reliably solve these problems. As for the issue of the "non-matching tag", it is dedicated to overcoming these issues with a refinement tag, ranking the importance of the label, and the relevant image grading approach. As far as the "ambiguity of consultation" problem is concerned, an effective approach is to provide several recovery results that cover several fundamentals of a query. Currently, image clustering and duplicate removal are the main approaches to solving the problem of diversity. However, the essence social images. Social and tagged images uploaded by users are user-oriented. These user-oriented sharing the same user and tag with the same query images are always taken in a fixed time interval at a specific point. It is well known that images taken in the same time range and fixed point are quite similar. To diversify top-ranked search results, it is best to reclassify results by deleting duplicate images of the same user.

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II. RELATED WORK

1. Xueming Qian, Dan Lu, Xiaoxiao Liu, “Tag Based Image Search by Social Re-ranking”, IEEE transactions on multimedia, MM-006206

Points:

1. Proposed method is effective and time-saving.
2. This social re-ranking method is effective and efficient.

2. Jiaming Zhang, Shuhui Wang, Qingming Huang, “Location-Based Parallel Tag Completion for Geo-tagged Social Image Retrieval”.

Points:

1. The learned tag sub-matrix of each POI reflects the major trend of users’ tagging results with respect to different POIs and users.
2. This parallel learning process provides strong support for processing large scale online image database.
3. Achieves better accuracy for automatic image annotation.
4. Enhances the computational efficiency.

3. Shuhui Jiang, Xueming Qian, Jialie Shen. “Author Topic Model-Based Collaborative Filtering for Personalized POI Recommendations”. IEEE TRANSACTIONS ON MULTIMEDIA, VOL. 17, NO. 6, JUNE 2015

Points:

In this work, user preference topics, such as cultural, cityscape, or landmark, are extracted from the geo-tag constrained textual description of photos via the author topic model instead of only from the geo-tags (GPS locations).

4. Xiyu Yang, Xueming Qian, Yao Xue “Scalable Mobile Image Retrieval by Exploring Contextual Saliency”. IEEE TRANSACTIONS ON IMAGE PROCESSING, VOL. 24, NO. 6, JUNE 2015

Points:

This approach requires less bandwidth and has better retrieval performance.

5. Jun Yu, Dacheng Tao, Meng Wang, Member, Yong Rui, Fellow, “Learning to Rank Using User Clicks and Visual Features for Image Retrieval”. IEEE TRANSACTIONS ON CYBERNETICS, VOL. 45, NO. 4, APRIL 2015.

Points:

1. Above proposed model is more robust and accurate ranking model.
2. In this model, the noises in click features will be removed by the visual content.

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6. Xueming Qian, Xian-Sheng Hua, Yuan Yan Tang, Tao Mei. "Social Image Tagging With Diverse Semantics". IEEE TRANSACTIONS ON CYBERNETICS.

Points:

This work is to improve textual-based image retrieval because the top-ranked tags are highly relevant to the image and have large semantic compensation.

7. Deepshikha Mishra, Uday Prtap Singh, Vineet Richhariya. "Tag Relevance for Social Image Retrieval in Accordance with Neighbor Voting Algorithm". IJCSNS International Journal of Computer Science and Network Security, VOL.14 No.7, July 2014.

Points:

1. The proposed algorithm does not require any model training for any visual concept; it is efficient in handling large scale image data sets.
2. The proposed algorithm predicts more relevant tags even when the visual search is unsatisfactory.

8. Meng Wang, Kuiyuan Yang, Xian-Sheng Hua, Hong-Jiang Zhang. "Towards a Relevant and Diverse Search of Social Images". IEEE TRANSACTIONS ON MULTIMEDIA, VOL. 12, NO. 8, DECEMBER 2010.

Points:

1. This work shown that the diversity of search results can be enhanced while maintaining a comparable level of relevance.
2. Effectiveness.

III. EXISTING SYSTEM APPROACH

Lee and Neve proposed to learn the relevance of tags by visually weighted neighbor voting, a variant of the popular baseline neighbor voting algorithm.

Agrawal and Chaudhary proposed a relevance tag ranking algorithm, which can automatically rank tags according to their relevance with the image content. A modified probabilistic relevance estimation method is proposed by taking the size factor of objects into account and random walk based refinement is utilized.

Li et al presented a tag fusion method for tag relevance estimation to solve the limitations of a single measurement on tag relevance. Besides, early and late fusion schemes for a neighbor voting based tag relevance estimator are conducted.

Zhu et al proposed an adaptive teleportation random walk model on the voting graph which is constructed based on the images relationship to estimate the tag relevance.

Sun et al, proposed a tag clarity score measurement approach to evaluate the correctness of a tag in describing the visual content of its annotated images.

Disadvantages of Existing System:

1. Tag mismatch social tagging requires all the users are the social network to label their uploaded images with their own keywords and share with others.

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2. Different from ontology based image annotation, there is no predefined ontology or taxonomy in social 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.
3. 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 causes of the query ambiguity.

IV. PROPOSED SYSTEM ARCHITECTURE

We propose a social re-ranking algorithm which user information is firstly introduced into the traditional ranking method considering the semantics, social clues and visual information 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.

Advantages of Proposed System

1. In order to improve the robustness of the algorithm to obtain the co-occurrence
2. Word set with respect to the given query, a new self-adaptive algorithm is introduced in this paper, in which relative frequency of each tag about the given query is required and a self-adaptive parameter is decided by this relative frequency.
3. In the intra-user re-ranking process, we take the views into consideration to learn the relevance score of each image. In order to achieve this, a new iterative algorithm to obtain the relevance score is proposed.
4. This system is more considerate when compared to existing systems.
5. Discussions about weight selection and image features in the regularization framework are complemented. Through this discussion, we find that our performance doesn't rely on the adjustment of parameters and feature selection. It's robust and relatively stable. Besides, in order to find an optimal number of representative images which are selected from each user's image set, many new comparison experiments and comprehensive discussions are added.

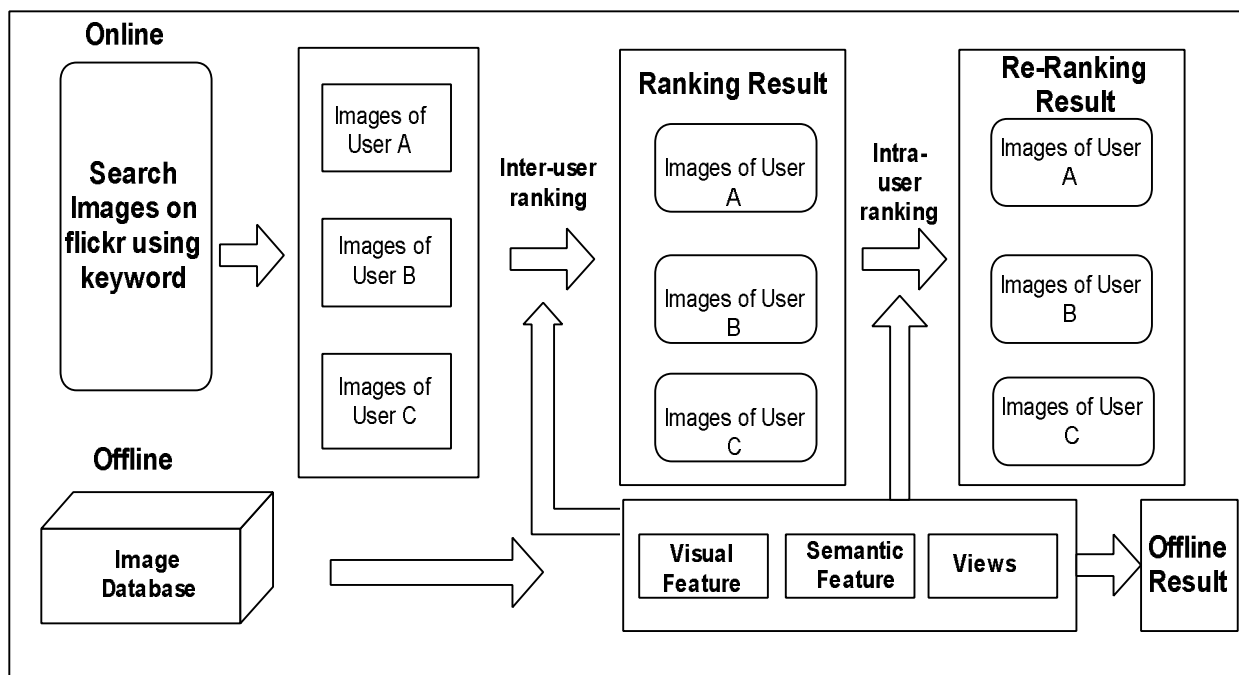


Fig 1. Proposed System Architecture

V. RESULT ANALYSIS

Average precision (AP): AP measures the ranking quality of the whole list. Since it is an approximation of the area under the precision-recall curve, AP is commonly considered as a good combination of precision and recall. The AP value is calculated as $(1/R) \sum_{i=1}^R \left(\frac{R_i}{i}\right) \delta_i$ where R is the number of relevant images in the list, R_i the number of relevant images in the top i ranked images, $\delta_i=1$ if the i^{th} image is relevant and 0 otherwise. For evaluation of the overall performance, we use mean average precision abbreviated as MAP, a common measurement in information retrieval. MAP is the mean value of the AP over all queries in the image retrieval experiment and all test images in the tag suggestion experiments.

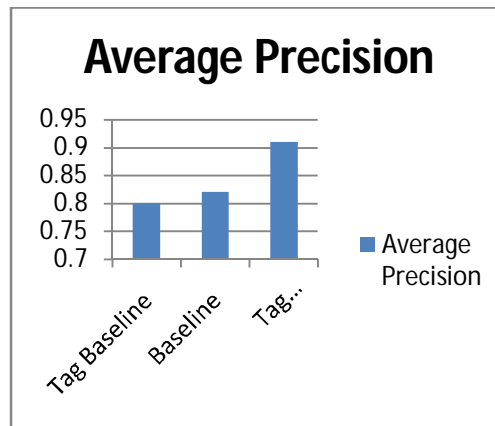
Results demonstrate that the proposed scheme is able to boost the diversity and relevance performance simultaneously also our social re-ranking method is effective and efficient.

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	Average Precision
Tag Baseline	0.8
Baseline	0.82
Tag Relevance(Images)	0.91

VI.CONCLUSION

In this paper, we propose a social re-ranking approach for tag-based image retrieval. In this social re-ranking technique, inter-user re-ranking and intra-user re-ranking are carried out to obtain the retrieved results. In order to enhance 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 expand the relevance performance of retrieved results.

However, in the inter-user ranking process only user's contribution is considered and the similarity among users is ignored. In addition to this, much information in Flickr dataset are still ignored, such as title information, time stamp and so on.

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