International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 04 Issue: 07 | July -2017 www.irjet.net p-ISSN: 2395-0072

Social Re-ranking using Tag Based Image Search

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Abstract - *The growing amount of user-tagged multimedia has led social image analysis and retrieval gain importance which has helped people organize and access user tagged multimedia. User tagging is uncontrolled, involves ambiguity and highly personalized hence a fundamental question arises how to interpret the relevance of user-contributed tag with respect to the visual content described by the tag. In this work, image's relevance and diversity is considered and a social re-ranking system for tag-based image retrieval is proposed. According to respective visual information, semantic information and social clues the images are re-ranked. The initial results include images contributed by different social users. Each user may contribute several images. Hence, first these images are sorted by inter-user re-ranking. The users that have higher contribution to the given query are ranked higher. Then sequential checking time stamp ranking is performed in which the desired output is obtained on basis of title information and the recent time stamp which enhances the diversity performance of image ranking system. It also counts number of views utilized to improve the relevance performance of the image retrieval results. The final retrieved results are composed of the selected images. A keyword relevancy match the data is retrieved for the social image dataset to accelerate the searching process. Experimental results on social dataset show that our tag image re-ranking method is effective and efficient.*

Key Words: *Social Media, Tag- based Image Retrieval, Image Search, Title Information Re-Ranking, Time-Stamp Re-Ranking.*

1. INTRODUCTION

Recently, Most of the online social media like Flickr, Picasa allow users to upload image and annotate the image content with free tags. Tag-based image search, return the resultant image with annotated tag which is relevant to the query input. Social tagging is successful on the Flickr, Picasa and Face book, still sometime it is not complete or it may contain ambiguity, Tag may be not have exact meaning associated with the image.

There is no control over tag applied by number of users on social networking sites, and the diversity of knowledge and information available to its users. Although how relevant id the tag with respect to visual content of the image is subjective for a specific user, an objective criterion is desirable for general-purpose search and visual content understanding. We consider a tag is relevant to an image if the tag applied to the image perfectly describes objective aspects of the visual content, or in other words, users with common knowledge relate the tag to the visual content easily and consistently. [1]. Generally speaking, tag-based image search is more commonly used in social media than content based image retrieval [2] and context-and-content based image retrieval [3]. In recent years, the re-ranking problem in the tag-based image retrieval has gained researchers' wide attention.

The proposed a social re-ranking algorithm in which user information is firstly used to rank user in descending order with respect to query those users have higher uploads are ranked first. Visual, semantics, social number of views and Timestamp is fused to get relevant and diverse result. The contributions of this paper can be described as follows:

1.1 A tag-based image search approach with social re-ranking. We systematically fuse the visual information, social user's information and image view times and TimeStamp to improve the diversity performance of search result.

1.2 Inter user ranking is used to rank users images according user uploads with respect to query input. With this ranking the system achieve the good balance between the relevance and diversity performance which also actively eliminate the similar images from the same user in a ranked result. in other word it removes the duplicate user images.

1.3 Duplicate user removal and time stamp ranking in which the desired output will get on the basis of duplication and the recent time stamp which improves the diversity performance of image ranking system.

1.4 The number of views to the image in social media is an important feature which indicates the click count of this image. The number of click count has been used to improve the relevance performance of the image retrieval results.

We take Flickr images as an example to study the attributes of social tagging. Flickr is one of the earliest and most popular social media sharing web sites and it has been intensively studied in recent years, especially on tagging characteristic, tag recommendation, etc. A recent analysis and study disclose that users do annotate their uploaded photos, pictures with the motivation to give access to the general public. However, the tags provided by Flickr users are highly redundant and may be not related to the visual content of image and there are only around 50% tags actually related to the image.

2. LITERATURE REVIEW

The Author X. Li et.al. [1], [4] Explained the idea is to understand and learn how relevant to the image from tagging behaviors of visual neighbors of that image. In particular, The algorithm estimates how tag is relevant by counting neighbor votes on tags and the tag refinement technique issued to improve the effectiveness of image tag recommendation for non-tagged images.

K. Yang et.al. explained major approaches in solving the diversity problem. However, the essence of social images is ignored. The social images uploaded by users and tagged by them self are user oriented. These images which has the same user and annotated with same input query are always taken in a fixed amount of time at a specific spot. It is 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 uploaded by the same user[5].

Author L. Chen proposed a relevance-quality ranking method considering both image relevance and quality. First, a relevance-based ranking scheme is used to automatically rank images according to their relevance to the input query tag, which returns the relevance scores based on both the image visual similarity and the semantic consistency of associated tags[6].

Author D. Liu et. al. proposed a two-step similarity ranking solution which retrieves interactive images. First it works on visual similarity and then develop a semantic-based similarity re-ranking method to address the dislocation problem[7][8][9].

Social image websites like Flickr, Face book allow users to annotate their images with a set of free tags. Thus, the tag-based image search can be easily search by using the tags as input query terms. This process is different from traditional content based image retrieval, web image websites, social media websites allow users to annotate social images with keyword being the effective approach for social image search. Most of the previous study regarding the re-ranking of the tag-based image retrieval focus on tag processing, which enhance the retrieval result for relevance ranking.

3. SYSTEM OVERVIEW

The proposed social re-ranking system includes two main sections: online and offline as shown in Fig.1.

The offline section contains two parts:

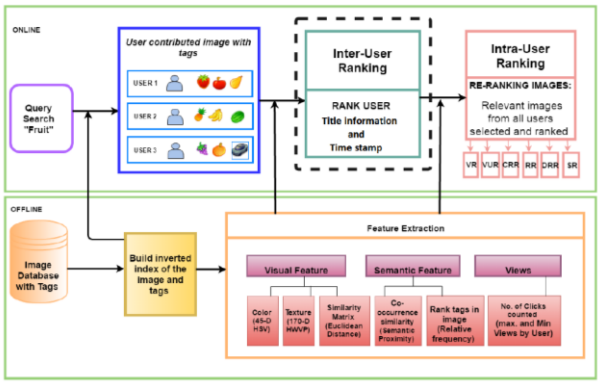

Fig.1. System Architecture

1) Inverted index structure construction for image dataset is built to accelerate the retrieval speed.

2) Feature extraction. In this paper, the visual feature, semantic feature, views and TimeStamp for the images dataset are extracted. Semantic feature refers to the co-occurrence word set of query tags and the tags of the images.

The online parts consist of the following three steps:

1) Keyword matching. For an input query, the system will return the initially retrieved results by keyword matching. The following two online steps are all conducted to re-rank the initial results.

2) Inter-user re-ranking. It is applied to rank the corresponding users with the considering their contributions to the given query.

3) Intra-user re-ranking. To determine the relevance level of each image by fusing the visual, semantic and views information into a unified system a regularization

framework is proposed. The most relevant image in each ranked user's image set is sequentially selected. These selected images constitute our re-ranking results [14].

4. METHODS OF RE-RANKING

Different approaches can be used in tag based image search as follows [14]: a) VR: View-based re-ranking, it is a measure that ranks the initial results by views in a descending order.

b) VUR: View and user based re-ranking. This approach is based on VR. In this approach the images which share same user are removed and the final re-ranked results are obtained. The image with the largest views for a user is kept in the top ranked results.

c) SR: Social re-ranking promotes the relevance and diversity performance of our results. Diversity performance is boosted by using User information. A regularization framework that combines semantic, visual and views information is put forward to improve the relevance performance.

d) TSR: The method proposed of Time stamp information is used to search tag based images by considering the time stamp information i.e. fused with Visual features, semantic Features, Views and time required to retrieve image from database. Time consumption in searching the result is reduced and desired output is obtained.

5. PROPOSED WORK

Re-ranking system for tag based images in social dataset is proposed. The contributions can be summarized as follows: A tag based images search for social dataset is proposed. Firstly the input query is taken from user. A particular meaningful keyword considers for example "animal" is taken. Then it will match the keyword.

The social re-ranking system includes online and offline as two main sections. Tag image dataset is used in offline section. Keyword matching and image re-ranking are done through offline mode. Online section uses the tag image dataset in offline mode.

Keyword is identified after this and relevancy matching is done. The synonyms are taken or identified for given query i.e. for example synonyms of "animals".
Keyword matching helps to identify keyword relevancy and the matched data is retrieved.
The retrieved data is gone through three steps:
1) Inter-User Ranking by Query – Users images are ranked according to given query. By applying Inter user ranking. A good trade-off is achieved between the diversity and relevance performance with this ranking system. This effectively eliminates similar images from the same user in a ranked result.

2) Time Stamp Ranking – The result of inter user ranking is gone through title and time stamp ranking. In this the desired output will is obtained on the basis of title information and the recent time stamp. This enhances the diversity performance of image ranking system.

3) Views Ranking – In social media community the views of an image is an important feature. It indicates the click count of image. The click count is used to improve the relevance performance of image retrieval results.

6. RESULTS

After all these process the system is ranked and the desired image is obtained. Experimental result dataset shows that social re-ranking method is effective and efficient. As Shown in Table.1. Social re-ranking time for retrieval has improved

	Offline(Seconds)	Online(Seconds)
VR	0	0.8421
VUR	0	3.8627
RR	163.2745	81.4735
CRR	38.05965	81.4735
DRR	3054.6124	83.9267
SR	38.05965	10.176
SR	38.05965	0.819 ms

Table.1. Social Re-ranking after TimeStamp[14]

VR- View based Re-ranking
VUR- View and User based Re-ranking
RR- Relevance Re-ranking
CRR - Co-occurrence based Re-ranking
DRR - Diverse Relevance Re-ranking
SR - Social Re-ranking without TimeStamp
SR - Social Re-ranking with TimeStamp

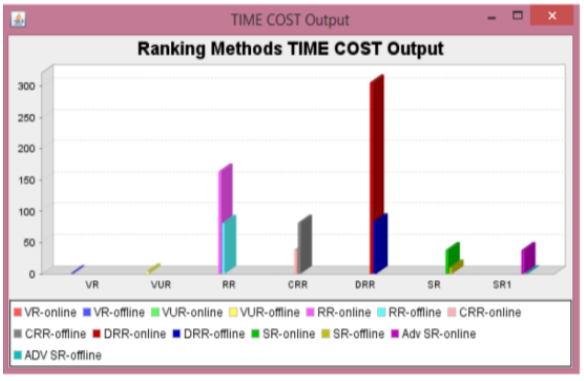

Fig.2. Social re-ranking for TimeStamp

APPLICATIONS

1. Development of system for easy and accurate tag based image retrieval.
2. The duplication of tag and tag mismatching is reduced.
3. Appropriate content retrieval system is developed.
4. Time for query based search is reduced by considering title information and time stamp ranking.
5.

7. CONCLUSION

In this paper a social re-ranking method for tag-based image retrieval is proposed. It is a newly developed approach for tag based image re-ranking of social dataset. It can be used for retrieval of images on the basis of "tagging". This approach helps people to organize and access increasing amount of user-tagged multimedia for social image analysis and retrieval. Tag-based image search is an important method to find images contributed by social users in social websites. Random sampling is not as good as content based visual search. A good tag relevance measurement is produced by content based visual search for both image ranking and tag ranking. This system is useful for easy and accurate tag based image retrieval using social re-ranking. Duplication of tag and tag mismatching is reduced by this system also develop the appropriate content retrieval system. Time required for query based search is also reduced by considering time stamp ranking. This is effective and efficient. This system enhances the diversity performance of image ranking system.

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