

# Label Based Picture Search by Social Re-ranking

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**Abstract-** Social media sharing websites like Flickr allow users to annotate pictures with free Labels, which significantly contribute to the development of the web picture retrieval and organization. Label-based picture search is an important method to find pictures contributed by social users in such social websites. However, how to make the top ranked result relevant and with diversity is challenging. In this paper, we propose a social re-ranking system for Label-based picture retrieval with the consideration of picture's relevance and diversity. We aim at re-ranking pictures according to their visual information, semantic information and social clues. The initial results include pictures contributed by different social users. Usually each user contributes several pictures. First we sort these pictures by inter-user re-ranking. Users that have higher contribution to the given query rank higher. Then we sequentially implement intra-user re-ranking on the ranked user's picture set, and only the most relevant picture from each user's picture set is selected. These selected pictures compose the final retrieved results. We build an inverted index structure for the social picture dataset to accelerate the searching process. Experimental results on Flickr dataset show that our social re-ranking method is effective and efficient.

## I. INTRODUCTION

With the development of social media based on Web 2.0, amounts of pictures and videos spring up everywhere on the Internet. This phenomenon has brought great challenges to multimedia storage, indexing and retrieval. Generally speaking, Label-based picture search is more commonly used in social media than content based picture retrieval [47] and context-and-content based picture retrieval. In recent years, the re-ranking problem in the Label-based picture retrieval has gained researchers' wide attention. Nonetheless, the following challenges block the path for the development of re-ranking technologies in the Label-based picture retrieval.

1) Label mismatch. Social Labeling requires all the users in the social network to Label their uploaded pictures with their own keywords and share with others. Different from ontology based picture annotation, there is no predefined ontology or taxonomy in social picture Labeling. Every user has his own habit to Label pictures. Even for the same picture, Labels contributed by different users will be of great difference [26, 48]. Thus, the same picture can be interpreted in several ways with several different Labels according to the background behind the picture. Thus, many seemingly irrelevant Labels are introduced.

2) Query ambiguity. Users cannot precisely describe their request with single words and Label suggestion system always recommend words that are highly correlated to the existing Label set, thus add little information to a users' contribution. Besides, polysemy and synonyms are the other causes of the query ambiguity.

Thus, a fundamental problem in the re-ranking of the Label-based social picture retrieval is how to reliably solve these problems. As far as the "Label mismatch" problem is concerned, Label refinement [2, 3, 21, 23, 25, 27], Label relevance ranking [18, 34, 36, 46] and picture relevance ranking approach [4, 8, 16, 22, 28, 34, 35] have been dedicated to overcome this problems. As for the "query ambiguity" problem, an effective approach is to provide diverse retrieval results that cover multiple topics underlying a query. Currently, picture clustering [9, 11] and duplicate removal [5-7, 10, 29, 30, 32] are the major approaches in settling the diversity problem. However, the essence of social pictures is ignored. The social pictures uploaded and Labeled by users are user-oriented. These user-oriented pictures which share the same user and Labeled with same query are always taken in a fixed time interval at a specific

spot. It is well-known that, pictures 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 pictures from the same user.

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, social clues and visual information of pictures. The contributions of this paper can be described as follows: 1) We propose a Label-based picture search approach with social re-ranking. We systematically fuse the visual information, social user's information and picture 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 pictures, but also effectively eliminate the similar pictures 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 picture in each user's picture set. To speed up the learning speed, we use the co-occurrence word set of the given query to estimate the semantic relevance matrix.

Comparing with the preliminary work [44], we have made some improvements as follows: 1) In order to improve the robustness of the algorithm to obtain the co-occurrence word set with respect to the given query in [44], a new self-adaptive algorithm is introduced in this paper, in which relative frequency of each Label about the given query is required and a self-adaptive parameter is decided by this relative frequency. 2) In the intra-user re-ranking process, we take the views into consideration to learn the relevance score of each picture on the basis of [44]. In order to achieve this, a new iterative algorithm to obtain the relevance score is proposed.

3) Comparing with the algorithm proposed in [44], this paper is more considerate.

Discussions about weight selection and picture 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 pictures which are selected from each user's picture set, many new comparison experiments and comprehensive discussions are added.

#### EXISTING SYSTEM

- ❖ Lee and Neve proposed to learn the relevance of Labels by visually weighted neighbor voting, a variant of the popular baseline neighbor voting algorithm.
- ❖ Agrawal and Chaudhary proposed a relevance Label ranking algorithm, which can automatically rank Labels according to their relevance with the picture 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 Label fusion method for Label relevance estimation to solve the limitations of a single measurement on Label relevance. Besides, early and late fusion schemes for a neighbor voting based Label relevance estimator are conducted.
- ❖ Zhu et al. proposed an adaptive teleportation random walk model on the voting graph which is constructed based on the pictures relationship to estimate the Label relevance.
- ❖ Sun et al. proposed a Label clarity score measurement approach to evaluate the correctness of a Label in describing the visual content of its annotated pictures.

#### PROPOSED SYSTEM

- ❖ 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 pictures. The contributions of this paper can be described as follows:
- ❖ We propose a Label-based picture search approach with social re-ranking. We systematically fuse the visual information, social user's information and picture view times to boost the diversity performance of the search result.

- ❖ 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 pictures, but also effectively eliminate the similar pictures from the same user in the ranked results.
- ❖ 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 picture in each user's picture set. To speed up the learning speed, we use the co-occurrence word set of the given query to estimate the semantic relevance matrix.

## IMPLEMENTATION

Implementation is the sLabele of the project when the theoretical design is turned out into a working system. Thus it can be considered to be the most critical sLabele in achieving a successful new system and in giving the user, confidence that the new system will work and be effective

The implementation sLabele involves careful planning, investigation of the existing system and it's constraints on implementation, designing of methods to achieve changeover and evaluation of changeover methods.

Modules:

In this project we have following four modules .

- i).Label-based Picture Retrieval,
- ii).Social Labels(clues),
- iii).Picture search,
- iv). Social Re-ranking.

Label-based Picture Retrieval:

Label-based picture search is an important method to find pictures contributed by social users in such social websites. However, how to make the top ranked result relevant and with diversity is challenging. In this paper, we propose a social re-ranking system for Label-based picture retrieval with the consideration of picture's relevance and diversity. Label-based picture search is more commonly used in social media than content based picture retrieval and context-and-content based picture retrieval. A Label-based picture search approach with social re-ranking. We systematically fuse the visual information, social

user's information and picture view times to boost the diversity performance of the search result.

Social Labels(clues):

Label mismatch. Social Labeling requires all the users in the social network to Label their uploaded pictures with their own keywords and share with others. Different from ontology based picture annotation, there is no predefined ontology or taxonomy in social picture Labeling. Every user has his own habit to Label pictures. Even for the same picture, Labels contributed by different users will be of great difference.

Picture search:

The Label-based picture search can be easily accomplished by using the Labels as query terms. However, the weakly relevant Labels, noisy Labels and duplicated information make the search result unsatisfactory. Most of the literatures regarding the re-ranking of the Label-based picture retrieval focus on Label processing, picture relevance ranking and diversity enhancement of the retrieval results. We propose a Label-based picture search approach with social re-ranking. We systematically fuse the visual information, social user's information and picture view times to boost the diversity performance of the search result.

Social Re-ranking:

We build an inverted index structure for the social picture dataset to accelerate the searching process. Experimental results on Flickr dataset show that our social re-ranking method is effective and efficient. 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, social clues and visual information of pictures. A social re-ranking method which fuses the user information into the traditional Label-based picture retrieval framework. We first get the initial results by keyword matching process.

SYSTEM ARCHITECTURE:

## CONCLUSION

In this paper, we propose a social re-ranking method for Label-based picture retrieval. In this social re-

ranking method, 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 picture are also firstly fused into a traditional regularization framework to enhance the relevance performance of retrieved results. Discussions and experiments have demonstrated that our proposed method is effective and time-saving.

However, in the inter-user ranking process only user's contribution is considered and the similarity among users is ignored. In addition to this, many information in Flickr dataset are still ignored, such as title information, time stamp and so on. For future work, we will investigate the similarity among user groups in Flickr dataset. Therefore, we can fuse these relationships to enhance the diversity performance of picture ranking system.

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