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Survey of Social Influence Analysis

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Abstract - Social media networks is becoming popular these days, where user interacts with each other to form social networks. Social media has revolutionized the way people share and access information. The photo sharing websites include Flicker, Picasa, YouTube support users to create, annotate, share, and comment on Media data. The user's social tagging includes metadata in the form of keywords that reflects user's preference over photos and tagging can be better utilized to mine the user's preference. It explicitly model user interaction and social relations in the tag generation process. It propose a regularized hypergraph learning solution to refine the correlations among user, image, tag and other metadata. While the traditional social tag analysis work focus on analyzing the image tag binary correlation, taking user factor and metadata into consideration shows superior performance in image tag refinement task.

Keywords – Hypergraph Learning, social image search, tag refinement.

INTRODUCTION

In social multimedia computing, current social multimedia platforms allow users interacting with multimedia through uploading, annotating, commenting, and interacting with each other through social media networks. In communities there are many social sharing websites, which allow users to share photos, web links, songs, pictures etc. The photo sharing websites include Flicker, Picasa, and YouTube support users to create, annotate, share and comment Media data. What makes Flickr special among other social media networks is its aspect that motivate users to perform various actions such as sharing photos with tags, joining in interested groups, contacting other users with similar interest as friends, as well as expressing their preference on photos by tagging, commenting, sharing. The fact is that user's social tagging options that add metadata in the form of keywords that reflects user's preference over those photos and tagging can be better utilized to mine the user's preference, leading to a huge amount of social images with user contributed tags, noisy and missing tags are predictable, which limit the performance of social tag-based retrieval system. Therefore, the tag refinement is used to denoise and enrich tags for an image is desired to tackle this problem.

Only about fifty percent of the tags provided by Flickr users are really correlated to the images. Second, it lacks an optimal level approach. Consider Flickr Photo sharing website as an example.

There are dual ranking options for tag based social image search.

1. Time-based ranking – It ranks images derived from the uploading time of each image
2. Interestingness-based ranking- It ranks images derived from each image's interestingness in Flickr.

Disadvantage of This method is it does not take the visual content and tags of images into consideration. Thus, both of these two ranking strategies are not based on relevance measure, and thus the search results are not sufficiently good in terms of significance. Therefore, well-organized tag based social image search methods are highly preferred.

In large social networks, users are influenced by others for various reasons. Social influence is most important topic in Social Networks and looks at how individual thoughts, actions and feelings are influenced by social groups. For example, the colleagues on LinkedIn will mostly impact ones choices in work, while the friends from Facebook have strong influence on ones preferences in daily life. Social influence mining in social media networks has critical importance in real world applications such as friend suggestion and photo recommendation. Much effort has been made for social network analysis and a large number of works has been done. Analyzing social influence in social media networks has received significant interest.

Existing works on tag refinement exploited the semantic association between tags and visual relationship of images to address the noisy and missing problems, Therefore Social Influence is one of important issue in the social media network.

Literature Survey

A] Multi-correlation Regularized Tensor Factorization (MRTF)

J. Sang et.al [2] proposed in, *"User-centric Social Multimedia computing",* User-created tags not only help the users in sharing and organizing Images, but also provide large amount of meaningful data for image retrieval. General studies on user-generated tags for tag based applications focused on exploiting the photos-tag, image-image and tag-tag relationships. Considering that user is the creator of the tagging activity and user involves with image and tag in many views, so the problem of tag refinement is tackled by improving user information.

A Tensor Decomposition Consist of

1. To jointly model the ternary user-image-tag interrelation and respective intra-relations.
2. The users, images and tags are represented in the corresponding latent subspaces. For a specified image, the tags with the highest cross-space associations are reserved as the ultimate annotation.

These Web 2.0 websites allocate users as owners, taggers, or commenter's for their contributed images to interact and cooperate with each other in a social media networks. Typically, in a photo sharing website, three types of interrelated entities are involved, i.e., image, tag and user. From this view, user contributed labeling data can be deemed as the products of the ternary interactions among images, tags and users. Given such a large-scale web dataset, noisy and missing tags are unavoidable, which limits the performance of social tag based retrieval system. Therefore, the tag refinement to denoise and tags for images is desired to tackle this problem.

Presented works on tag refinement oppressed the semantic association between tags and visual similarity of images to tackle the noisy and missing issues, while the user interaction as one of important entities in the social tagging data is neglected. Users are the inventor of the tagging action and it involve with images and tags in many views. It is assumed that the integration of user information contributes to a improved understanding and explanation of the tagging data. Consider a example to explain this examination, both images are labeled with apple by the two different user, but they have different image content, i.e. apple as a fruit and apple as iphone respectively. Due to the familiar semantic space, conventional work on image content understanding cannot solve the problem. User related and surroundings information can be benefit to give the image semantics. So, iphone fan will possibly use apple to tag a phone image, while a fruit specialist will use apple to tag a fruit.

It is not necessary to explicitly know the users benefit or profiles. Aim of our work is to improve the associations between the images and tags provided with the unprocessed tagging data from photo sharing websites. So here it is solved from a factor investigation perspective and aim at construction of the user sensitive image and tag issue representations.

A new method named Multi-correlation Regularized Tensor Factorization (MRTF) is used to deal with the tag improvement task.

1. Tensor factorization is utilized to jointly model the multiple factors.
2. To improve the sparsity problem, many intra-relations are used as the smoothness constraints and then the factors inference is regularized tensor factorization problem.
3. It encode the compact users, visual and tags representation over their hidden subspaces, tag refinement is performed by computing the cross-space image-tag associations.

Advantages of this method:

1. User information is introduced into the social tag processing and jointly models the many issue of user, image and tag by tensor factorization.
2. The MRTF model is used to extract the latent factor representations. The Sparsity problem is alleviated by imposing the smoothness constraints.

Limitation is that it survive different forms of metadata, such as descriptions, comments, and ratings. While focus was more on tags, so how to form other metadata for overall perceptive is one of drawback of this method.

B) Separated Method

Li et al. [4] proposed in, "*Tag based social image search with visual-text joint hypergraph learning",* in which simply the visual contents is used to calculate the significance score for each image.

In separated method

- Tags or the visual contents are utilized separately to calculate the significance of the social image.
- The relevance score of the social image is calculated only by using the visual or the textual content of the image.

Liu et al. intended a tag ranking method, which is able to rank the tags that are related with an image according to their relevance levels. Li et al. introduce an approach that learns the relevance scores of tags by a neighborhood voting approach. Xu et al. propose a

tag refinement algorithm from the topic modeling point of view. Liu et al. propose a tag ranking method, which is able to rank the tags that are related with an image according to their relevance levels.

Disadvantages of this method:

1. Only image content or the tags are used for image search, in which the useful information is lost.
2. Search result may not be satisfactorily good.

C) Sequential Method

Li et al. [4] proposed in, "*Tag based social image search with visual-text joint hypergraph learning",* in sequential approach visual contents and tags used sequentially for social image search. In most of the existing methods textual-content based analysis is performed first and then the visual content based analysis is performed next.

It is the relevance based ranking method used for social image search. First the relevance scores are calculated based on the tags of the images and then these calculated relevance scores are refined using the visual content of the images. Though more than half of the tags are noisy there are also meaningful tags that are useful for the searching of the image. Liu et al. propose a significance-based ranking technique for social image search, which first learns significance scores based on the tags of photos and then refines the significance scores by exploring the image content.

D) Hypergraph Learning

In many real-world problems, relationships surrounded by the objects of our interest are more difficult than pairwise. Complex relationships into pairwise ones will unavoidably lead to loss of information that can be valuable for our learning tasks. In many real-world problems, representing a set of complex relational objects as undirected or directed graphs is not complete. To construct an undirected graph in which two vertices are grouped together by an edge. if there is at least one common user of their corresponding articles and then an "*undirected graph based clustering"* approach is applied.

In undirected graph based clustering:

1. It ignore the information on whether the same user joined writing three or more articles or not.
2. Information loss is unpredicted because the articles by the same user likely belong to the same topic and hence the information is useful for our grouping task.

Therefore use hypergraph instead to completely represent complex relationships surrounded by the objects of our interest. Yu et al. [5] proposed in, "*Higher order learning with graphs*" used for image classification. Hypergraph is a graph in which an edge can connect more than two vertices. In other words, an edge is a subset of vertices. The tag-based social image search cannot achieve suitable results because of the high amount of noise present in the user-provided tags. Most of the tags are mistakenly spelled so they can be considered as irrelevant. Hypergraph learning method is used to tackle this problem. It can completely represent the complex relationships among objects by using hypergraph.

Hypergraph has been used in many data mining and information recovery responsibilities, for their effectiveness for higher-order relationship modeling. Hypergraph learning technique it simultaneously utilized the visual and the tags content in hypergraph learning method. In this method, each image is represented by a vertex in the constructed hypergraph, and the visual clustering results are employed to construct the hyperedges.

Hypergraph learning method is used to rank images according to the relevance levels of images. This mechanism established the usefulness of hypergraph structure in capturing higher order relationship. In the hypergraph, the vertices signify users and images, and the hyperedges are utilized to capture visual, textual content relations among images, and social links between users and images. Hypergraph is used to model users, images, and various types of relations in the Flickr network.

Advantage of this method:

1. Noisy textual and image features can be reduced, and this makes our approach more robust than the previous methods.
2. It is used to effectively model users, images, and various types of relations.

Comparison of all methods:-

Author	Method	Representation				Results
		User	Image	tag	Metadata	
J.Sang et.al [2]	Multi correlation Regularized Tensor Factorization (MRTF)	Yes	Yes	Yes	No	The Sparsity problem is improved by imposing the smoothness constraints.
Li et al. [4]	Separated method	No	Yes	Yes	No	Only visual information or the tags are used for image search, in which the useful information is Missing.
Li et al. [4]	Sequential method	No	Yes	Yes	No	The lack of an optimal ranking approach is reason for the insufficient search results.
Yu et al.[5]	Hypergraph learning method	Yes	Yes	Yes	Yes	Noisy textual and visual features can be reduced, and this makes approach more resilient.

CONCLUSION

It explored related research efforts that generally focused on information retrieval tasks. Our intention is to recognize the trends in the surveyed area and categorize them in a new way that would integrate and add understanding to the work in the field with respect to the Flickr social media network. Users with similar feature representations can be recommended to each other to connect people with common interests and motivate people to contribute and share more content.

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