JOINT HYPERGRAPH LEARNING FOR TAG BASED IMAGE RETRIEVAL

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Abstract

As the image sharing websites like Flickr become more and more popular, extensive scholars concentrate on tag-based image retrieval (TBIR). It is one of the important ways to find images contributed by social users. In this research field, tag information and diverse visual features have been investigated. However, most existing methods use these visual features separately for tagging the images. In this proposed work, we propose a global and local visual features fusion approach to learn the relevance of images by hypergraph approach. A hypergraph is constructed first by utilizing global, local visual features and tag information.

1. INTRODUCTION

With the development of social media based on Web 2.0, huge amounts of images spring up everywhere on the Internet, which makes many online tasks such as image retrieval [4-9, 22, 23, 32-34, 38-44], image recommendation [75, 76] very challenging. The large-scale web images demand the researchers to develop efficient algorithms for more accurate indexing and retrieval. Compared with content-based image retrieval (TBIR), tag-based image search is more commonly used in social media [32, 51]. In the last few decades, extensive efforts have been dedicated to image relevance retrieval. However, many algorithms can't achieve satisfactory results for tag mismatch, noisy tags and query ambiguity problems [51]. Thus, more and more researchers attempt to utilize visual features and user relevance feedback to improve the retrieval accuracy. There are several visual features designed to express images such as color feature [29], shape feature [36], textural feature [37], edge feature [1], SIFT [16] and deep feature [58, 62].

Different visual features describe different aspects of an image. Therefore, some algorithms try to fuse multiple visual features to improve the image retrieval precision [2, 4, 5, 33]. However, most existing methods usually explore multiple visual features separately. For example, Yang et al. [2] first construct a graph for every feature. Then they apply random walk model to get a relevance score according to each constructed graph. Finally, they re-rank the images by the linear combination of the relevance scores of different features.

Zhang et al. [4] first select training samples, then they apply multiple visual features by simpleMKL to train the classification function for image ranking. In [5], Yang et al. learn the Mahalanobis matrix for different visual features and calculate the distance of images by the Mahalanobis distance of corresponding visual feature. Yu et al. [33] construct five hypergraphs for five visual features, and integrate the visual consistency constrains of these hypergraphs to learn a linear model for ranking.

The hypergraph can be regarded as a generalization of the graph. Compared to conventional graph, hypergraph can model the relationship of more than two vertices and more complex relationship between objects [3]. Several papers have shown the superiority of hypergraph [14-17]. Hypergraph not only takes pairwise relationship into consideration, but also models the higher order relationship among three or more vertices containing grouping information. Hypergraph method is widely used in data mining and information retrieval tasks [6, 7]. Cai et al. [9] first train attribute ion classifiers, then construct hypergraph based on these classifiers, finally they obtain the relevance score by hypergraph learning. Jing et al. [10] request users' relevance feedback, then they propagate relevance of feedback images to other images, finally a hypergraph is constructed based on the k-nearest mechanism. Gao et al. [34] construct hypergraph by tags and local visual feature, and get the final relevance score of images by hypergraph learning. Yu et al. [33] construct hypergraphs based on different visual features separately, then learn a linear model for ranking by these hypergraphs. In this paper, we propose a hypergraph-based approach to simultaneously utilize different visual features and tags for image relevance learnin.

OBJECTIVE

In General, a **hypergraph** is a generalization of a graph in which an edge can join any number of vertices. In contrast, in an ordinary graph, an edge connects exactly two vertices

SCOPE

In this proposed work, we propose a global and local visual features fusion approach to learn the relevance of images by hypergraph approach. A hypergraph is constructed first by utilizing global, local visual features and tag information.

2. LITERATURE SURVEY

INRODUCTION

Literature survey is the most important step in software development process. Before developing the tool, it is necessary to determine the time factor, economy and company strength. Once these things are satisfied, ten next steps are to determine which operating system and language used for developing the tool. Once the programmers start building the tool, the programmers need lot of external support. This support

obtained from senior programmers, from book or from websites. Before building the system the above consideration r taken into for developing the proposed system.

RELATED WORK

Social image share websites like Flick usually ask the users for several tags when they upload their sharing images. The online retrieval can be conducted by key words match. However, the retrieval results are not satisfactory for the unreliable tags. Therefore, a series of methods are proposed aiming at incorporating visual factors into image ranking over the last decades.

Hypergraph has shown its ascendency in information retrieval task [14-17]. Many scholars designed their algorithms based on hypergraph for image retrieval. The following subsections present the existing works related to the above two aspects respectively. A. Image Visual Re-Ranking The massive available images in internet make the retrieval task challenging. There are lots of researches done on the tag based image retrieval. Visual re-ranking is one of important methods to improve the retrieval results. The existing visual re-ranking methods can be classified into three categories: clustering based, classification based and graph based approaches. Clustering based methods are based on the truth that the relevant images to query share high visual similarity. In clustering based methods, images in the initial list are first grouped into different clusters and then sorted based on the cluster conditional probability.

Duan et al. [38] first cluster the images by textual and visual features respectively and then treat each cluster as a word (textual or visual). Finally, the ranking problem is modeled as a multi-instance learning problem in which the pseudo-positive samples are the top ranked images and negative samples are randomly selected. In [39], Tang et al. propose an intent based search approach that aims at solving the query ambiguity in TBIR. They ask the user to click one query image, by which they capture the user's search intent. Then, the images from a group which is obtained by text-based search are re-ranked based on both visual and textual information. The classification based image retrieval approach consists of three steps in general: the positive and negative samples from the initial retrieval list are selected first, then classifiers are trained and finally the initial images are ranked according to the scores from the trained classifier.

Tian et al. [40] propose a re-ranking method with user interaction, which first selects images according to an active sample selection method and then asks the user to label them. Finally, it learns a discriminative sub-manifold by the label information. In [38], Lekshmi et al. first request a feedback image from user and select positive images, then they train a perceptron based on the selected samples. Instead of requiring user's effort, obtaining training samples by click information is more practical. Several papers have shown that the user's click is a reliable clue for revealing images relevant or not [2, 4, 5, 41-44].

Yang et al. treat the click information as implicit relevant feedback and select the top clicked images as the relevant samples [42]. The re-ranking processing is conducted by the learned simpleMKL model. Ginsca et al. [44] also select the top clicked images as relevance samples, then they extract multiple visual

features to train multiple classifiers. Finally, they fuse the results of these classifiers to re-rank images.

Yan et al. [45] use conventional idea of pseudo-relevance feedback that treats top ranked images as the pseudo-positives and bottom as the pseudo-negatives. In graph based methods, a graph is used to capture the relations between images. The graph is constructed with images or tags as nodes and the edges are weighted by visual or textual likeness. Image re-ranking is performed by graph learning algorithm.

3. EXISTING SYSTEM

In the Existing system, we try to use existing methods use these visual features separately for tagging the images and hence it is very complex task for the users to pair all the set of images into one category or group

LIMITATION OF EXISTING SYSTEM

The following are the limitations that take place in the existing system. They are as follows:

1. It is not efficient.
2. Its take lot of time for find the image.
3. Images with Low quality cant able to identify in the existing system.
4. There was no method to match the images automatically and apply tags based on comments posted by several users.

4. PROPOSED SYSTEM

In this proposed work, we propose a global and local visual features fusion approach to learn the relevance of images by hypergraph approach. A hypergraph is constructed first by utilizing global, local visual features and tag information.

ADVANTAGES OF THE PROPOSED SYSTEM

The following are the advantages of the proposed system, they are as follows:

1. We can easily get the images using hyper graph learning.
2. Very faster than old system.
3. In this proposed system we have a facility to tag images automatically based on user feedback.
4. We have a facility to show the retrieve the favorite feedbacks

5. PROJECT MODULES

Implementation is the stage where the theoretical design is converted into programmatically manner. In this stage we will divide the application into a number of modules and then coded for deployment. We have implemented the proposed concept on Java programming language with J2EE as the chosen language in order to show the performance this proposed protocol.

There are totally 2 main modules in this project, and inside these two main modules there are several sub modules also present. They are as follows :

1. Admin/Server Module
2. User Module

5.1 ADMIN/SERVER Module

In this module, the Admin has to login by using valid user name and password. After login successful he can perform some operations such as ,View users and give authorization, View user's Request and generate secret key using RSA ,Add Image Category and View all Categories, Add Images ,View All added images with scores and Reviews ,View All added images with Feature attracted on Image, View all images based on clusters by using Circles format, View All images with scores in chart, View All keyword with scores in chart, View All Feature attracted keyword with scores in chart

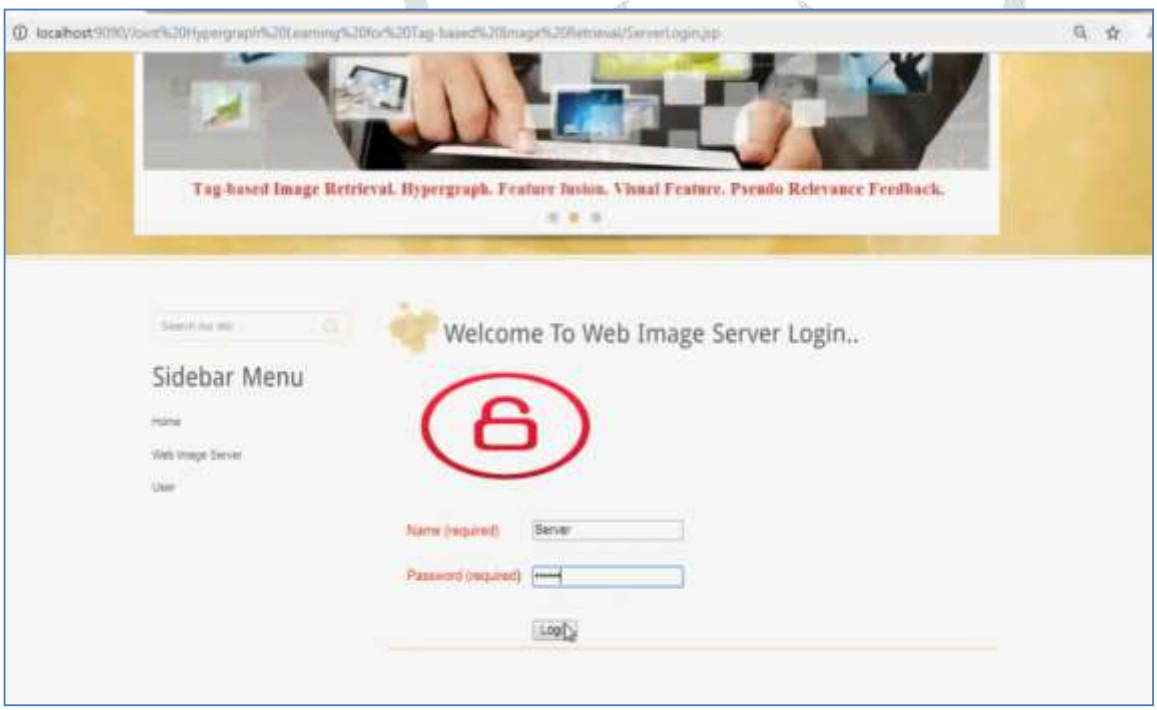
5.2 USER Module

In this module, there are n numbers of users are present. User should register before performing any operations. Once user registers, their details will be stored to the database. After registration successful, he has to login by using authorized user name and password. Once Login is successful user can perform some operations like Requst Secret key to search images ,view secret key if it is generated,Enter secret key to Search Images by keyword,show only images and view related images,give reviews,enter Feature attracted in Image,View all search transactions ,Search images for Feature attracted Images ,View all search transactions by Feature attracted keyword

6. RESULTS

6.1 Homepage

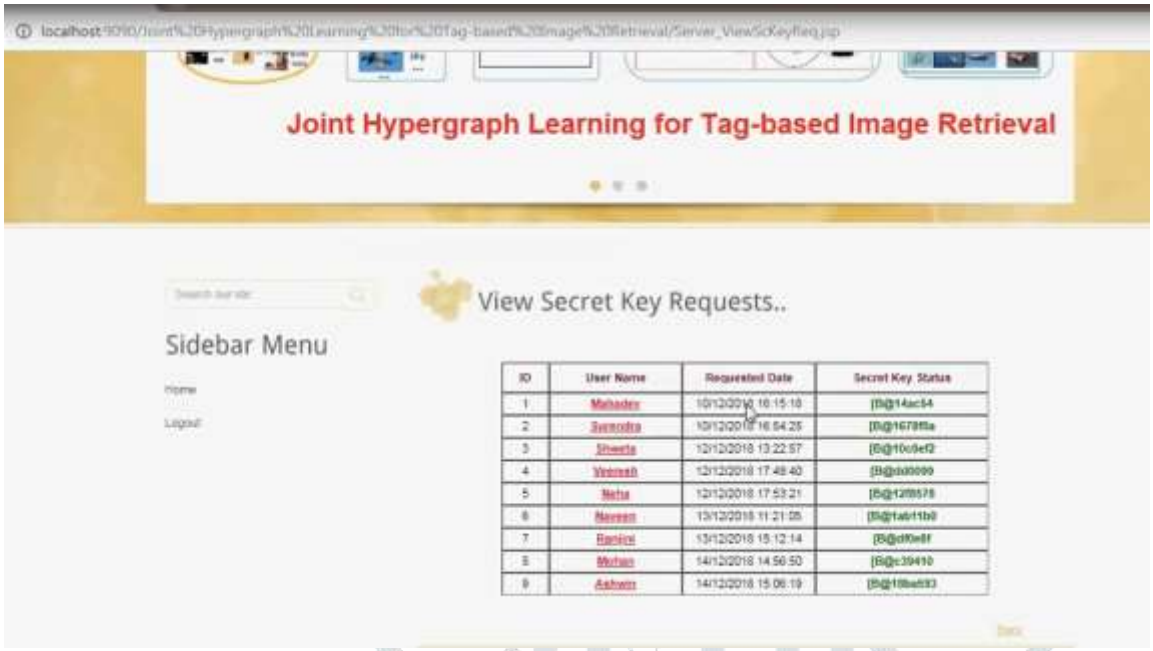
Server Login



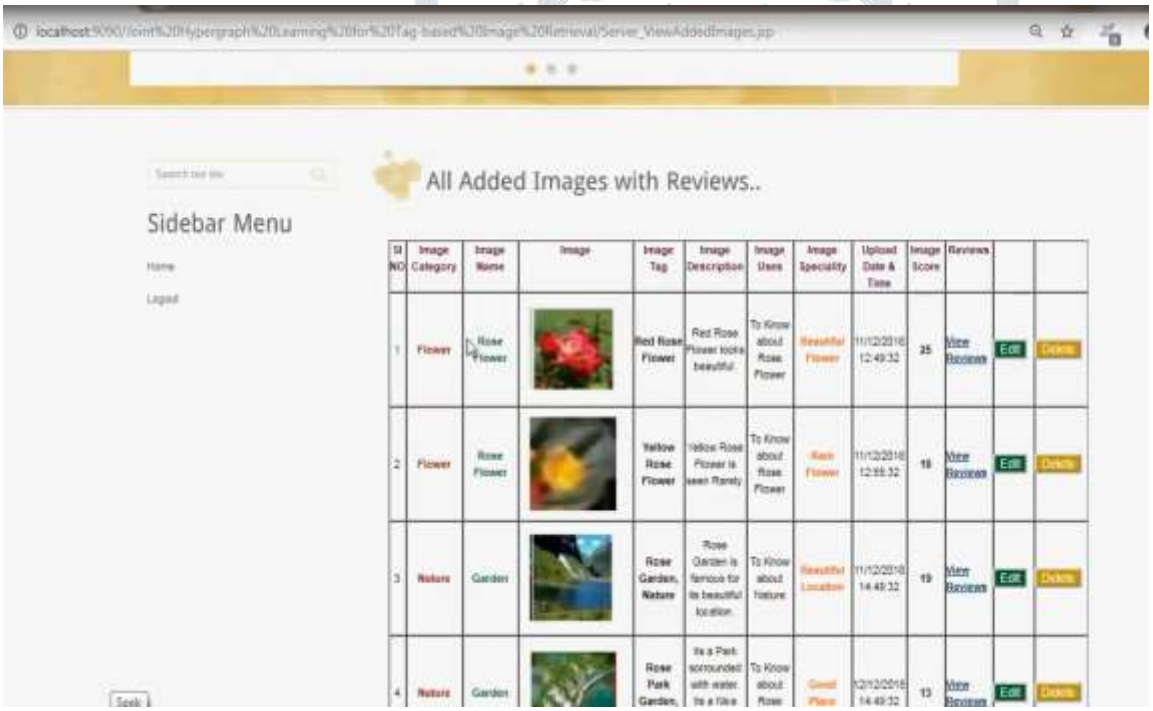
SERVER HOME PAGE

SERVER CAN VIEW REGISTERED USERS AND AUTHORIZE

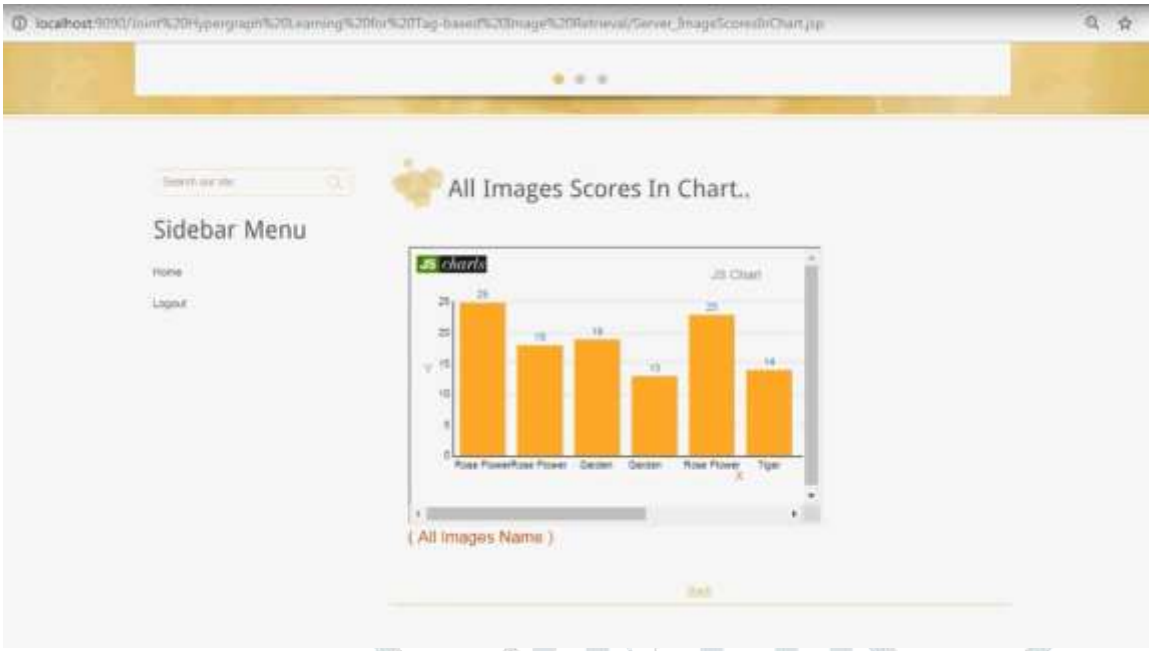
SERVER CAN VIEW SECRET KEY REQUEST



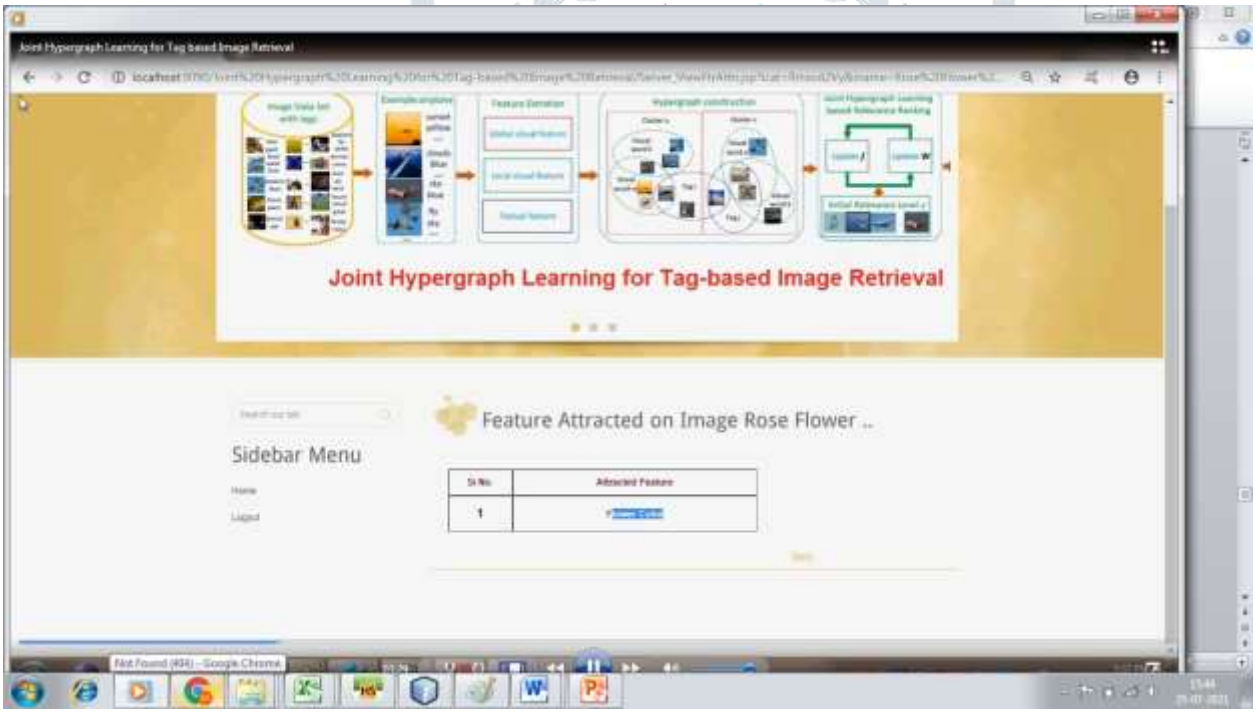
SERVER CAN VIEW ALL IMAGES WITH REVIEWS



ADMIN CAN VIEW CHART



ADMIN CAN SEE LIST OF FEATURES EXTRACTED FROM POST



USER LOGIN AND HOMEPAGE

USER TRY TO SEARCH IMAGES BASED ON KEYWORDS

USER CAN GIVE EXTRACTIONKEYWORD

7. CONCLUSION

In this project, we proposed a new joint re-ranking method for social image retrieval, in which we simultaneously utilize global, local visual features and textual feature to improve the retrieval accuracy. Experiment results on NUS-Wide dataset show that combing the global and local visual features is much better than using any of them alone and also more efficient than the comparison methods..

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