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Preserving Privacy for User Shared Images with Discovering Friends in Social Networks

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Abstract--At present, billions of user shared images are generated by individuals in many social networks daily and this particular form of user data is indeed very accessible to others due to the nature of online image sharing. Some users also hide or limit the information of their connections from the public in social media platforms due to privacy concerns. Accessing these SGs is getting more difficult and costly in today's online social networks, and novel applications using SGs become almost impossible to be offered independently by third-party practitioners and individuals.

IndexTerms—bigdata, Connection, Discovery, Recommendation, Social Network Analysis, User-Shared Images.

I. INTRODUCTION

Data mining, or knowledge discovery, is the computer-assisted process of digging through and analyzing enormous sets of data and then extracting the meaning of the data. Data mining tools predict behaviors and future trends, allowing businesses to make proactive, knowledge-driven decisions. Data mining tools can answer business questions that traditionally were too time consuming to resolve. They scour databases for hidden patterns, finding predictive information that experts may miss because it lies outside their expectations.

Data mining derives its name from the similarities between searching for valuable information in a large database and mining a mountain for a vein of valuable ore. Both processes require either sifting through an immense amount of material, or intelligently probing it to find where the value resides. User connection is useful information for many personalized services or applications in online social networks. Such connections can be any type of online social relationship formed from some interactions between users in a social network, such as online friendship, a follower/followee relationship or a membership in the same community.

Companies like Twitter and Pinterest, already have explicit information about user online friendships (i.e., social graphs) to improve their service relevance to users. Online social networks (OSNs) such as Face book, Google+, and Twitter are inherently designed to enable people to share personal and public information and make social connections

with friends, coworkers, colleagues, family, and even with strangers. In recent years, we have seen unprecedented growth in the application of OSNs.

The proposed system is developed to check the connection between the two users that is if any user the request is given to the other user. The status of the given request is verified that user give approve request or he reject that request is mentioned to verify the request. The privacy settings for the each user is set independently by the user form his login. The separate restriction can be given from the user login to view the data by the different users or different group in connection. The given request details and the reject details can be viewed separately from the user login itself. There is no provisions will be given to view the previous user approval and the reject status. And the user does not know the status of the other user with us is not shown in this thesis. For this reasons the proposed system is needed.

OBJECTIVES

- The proposed system aims in solving the social media privileges among the shared images.
- To provide separate settings for the single user.
- To provide separate settings for the shared text massages.
- To set privilege for sharing the comment in each group.
- Rejected friends view can be made easily.
- Restrictions are provided for uploading the images.
- Approval can be given for the end user and the level of privilege are set to the end user.

II. LITERATURE REVIEW

Lars Backstrom, Jure Leskovecstated that predicting the occurrence of links is a fundamental problem in networks. In the link prediction problem they are given a snapshot of a network and would like to infer which interactions among existing members are likely to occur in the near future or which existing interactions are missing. Although this problem has been extensively studied, the challenge of how to effectively combine the information from the network structure with rich node and edge attribute data remains largely open.

They developed an algorithm based on Supervised Random Walks that naturally combines the information from the network structure with node and edge level attributes. They proposed Supervised Random Walks, a new learning algorithm for link prediction and link recommendation. By utilizing node and edge attribute data of their method guides the random walks towards the desired target nodes. Experiments on Face book and co-authorship networks demonstrate good generalization and overall performance of Supervised Random Walks.

Jure Leskovec, Daniel Huttenlocher, Jon Kleinberg Online social networks in which relationships can be either positive (indicating relations such as friendship) or negative (indicating relations such as opposition or antagonism). Such mixes of positive and negative links arise in a variety of online settings; they studied datasets from Epinions, Slashdot and Wikipedia. They found that the signs of links in the underlying social networks can be predicted with high accuracy, using models that generalize across this diverse range of sites. These models provide insight into some of the fundamental principles that drive the formation of signed links in networks, shedding light on theories of balance and status from social psychology; they also suggest social computing applications by which the attitude of one user toward another can be estimated from evidence provided by their relationships with other members of the surrounding social network.

Adam Rae, BorkurSigurbjornsson, Roelof van Zwoladdressed the task of recommending additional tags to partially annotated media objects, in these case images. They proposed an extendable framework that can recommend tags using a combination of different personalized and collective contexts. They combine information from four contexts: (1) all the photos in the system, a user's own photos, the photos of a user's social contacts, and the photos posted in the groups of which a user is a member. Variants of methods and have been proposed in previous work, but the use of and is novel. For each of the contexts they use the same probabilistic model and Borda Count based aggregation approach to generate recommendations from different contexts into a unified ranking of recommended tags. They evaluated their system using a large set of real-world data from Flickr. They showed that by using personalized contexts they can significantly improve tag recommendation compared to using collective knowledge alone. They also analyze their experimental results to explore the capabilities of the system with respect to a user's social behavior.

Raphael Ottoni, Joao Paulo Pesce et aldescribes Online Social networks (OSNs) have become popular platforms for people to connect and interact with each other. Among those networks, Pinterest has recently become noteworthy for its growth and promotion of visual over textual content. The purpose of this study is to analyze this image based network in a gender-sensitive fashion, in order to understand (i) user motivation and usage pattern in the network, (ii) how communications and social interactions happen and (iii) how users describe themselves to others. This work is based on more than 220 million items generated by 683,273 users. They were able to find significant differences all mentioned aspects. They observed that, although the network does not encourage direct social communication, females make more use of lightweight interactions than males. They focused on gender-based analysis of user behavior and their contributions are the following: They developed a distributed crawler to collect a large dataset from Pinterest. Over a period of 50 days, they collected more than 2 million profiles, which comprise beyond 850 million images and videos pinned into more than 20 million boards.

By analyzing the behavior of users in the network, they are able to draw relevant conclusions on how different users interact with the service.They found that males and females have distinct motivations when using the OSN: women tend to use the website to search and keep a record of items of interest mainly related to products and services, while men tend to act as curators, keeping a collection that reflects their tastes.In a network where text is secondary and communication is image based, they studied how social interactions are developed. They found that conclusions drawn by social researchers about gender, in which females are more social than males inside OSNs, hold true in the form of lightweight interactions such as likes and reciprocity.

Ido Guy, NaamaZwerdlingetalstudied personalized item recommendation within an enterprise social media application suite that includes blogs, bookmarks, communities, wikis, and shared files. Recommendations are based on two of the core elements of social media–people and tags. Relationship information among people, tags, and items, is collected and aggregated across different sources within the enterprise. Based on these aggregated relationships, the system recommends items related to people and tags that are related to the user. Each recommended item is accompanied by an explanation that includes the people and tags that led to its recommendation, as well as their relationships with the user and the item. They evaluated their recommender system through an extensive user study. Results show a significantly better interest ratio for the tag-based recommender than for the people-based recommender, and an even better performance

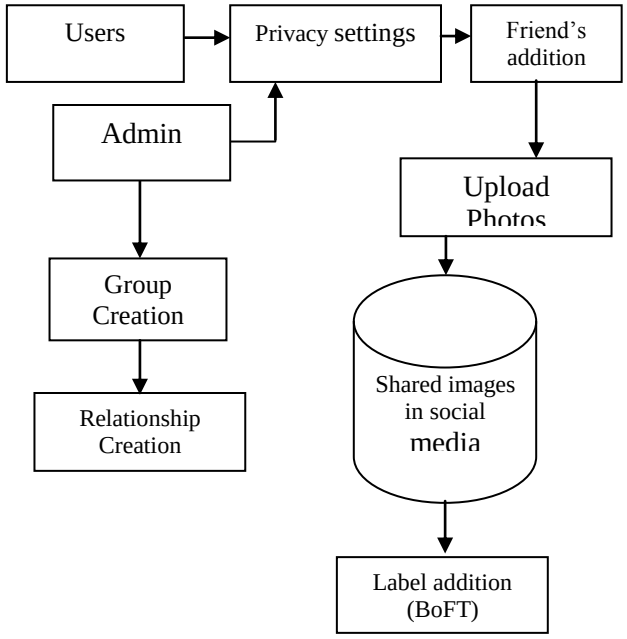
for a combined recommender. Tags applied on the user by other people are found to be highly effective in representing that user's topics of interest.

Wing S. Chow, Lai Sheung Chan studied further develop an understanding of social capital in organizational knowledge-sharing. They first developed a measurement tool and then a theoretical framework in which three social capital factors (social network, social trust, and shared goals) were combined with the theory of reasoned action; their relationships were then examined using confirmatory factoring analysis. Then they surveyed of 190 managers from Hong Kong firms, they confirmed that a social network and shared goals significantly contributed to a person's volition to share knowledge, and directly contributed to the perceived social pressure of the organization. The social trust has however showed no direct effect on the attitude and subjective norm of sharing knowledge. It offers insights to practitioners on the value of social capital and reasons why people are or are not willing to engage in knowledge sharing within an organization. They also found that social network and shared goals directly influenced the attitude and subjective norm about knowledge sharing and indirectly influenced the intention to share knowledge. Social trust did not play a direct role in sharing knowledge and organizational members do not differentiate between tacit and explicit knowledge when they share it.

III OVERVIEW OF PROPOSED METHODOLOGY

In this paper, proposed a method BoFT (Bag of Features Tagging) that labels images with non-user generated labels, BoFT labels, and how BoFT similarity, the pair-wise similarity among users based on BoFT labels is calculated. The first part is image collection, followed by connection discovery using BoFT. The second part focuses on how to recommend follower/followers' based on the discovered connections and the BoFT similarity distribution. From the collection of user shared images, Feature extraction is made on the user-images to find the similarities on the features. The next process is clustering of the extracted visual features into groups using k-means clustering technique. Then the number of occurrences in each group of visual words is calculated. With those grouped features, tags are labeled using BoFT labels.

It introduces a new privacy management model that is an improvement over traditional group-based policy management approaches. The new paradigm leverages a user's memory and opinion of their friends to set policies for other similar friends, which we refer to as Same-As Policy Management. Users associate the policy with an example friend and in doing so have this friend in the forefront of their mind. This allows users to be more selective and careful in assigning permissions. Users are thinking of people, not groups. Using a visual policy editor that takes advantage of friend recognition and minimal task interruptions, Policy Management demonstrated improved performance and user perceptions over traditional group-based policy management approaches. Further it is enhanced by introducing Friend Selection—two techniques for aiding users in selecting their example friends that are used in developing policy templates.



Architecture of the Proposed Methodology

IV. TECHNIQUES

The proposed system takes care of conflict resolution in privilege settings. Moreover, weaker policy settings of a person will not violate the policy settings of his/her friends. Privacy settings adjustments are shown such that violaters if included in the friends list, they are shown and suggested that they cannot allow to disseminate the photo contents to others. Privacy settings like Owner overrides are implemented.

It has the following advantages such as Weaker policy on one of the friends will not violate his/her friends' policy. Automatic configuration of privacy preferences is included. Conflict resolution between privileges is effective. Uploading duplicate content is description is avoided. More number of privacy settings is suggested.

V. EXPERIMENTS

(A)GROUP ADDITION

The administrator logins to the web site using this module. The username and password is stored in 'Admin' table and one of the username and passwords is to be given to login to the application. The administrator option page will be displayed only after proper login. The administrator adds group details using this module. The group code and name is

stored in 'Groups' table. The user registration involves selecting any one of the group.

(B)RELATIONSHIP TYPE ADDITION

The administrator adds relationship type details using this module. The relationship type code and name is stored in 'RelationshipType' table. The user during other user addition may select any one of the relationship type such as Family, Friend, Colleague, etc

(C)LABEL ADDITION

In this module, the category of the images is assigned here that reflect the context of the images, regardless of their popularity. It helps to calculate abd labels images with non-user generated labels, BoFT (Bag-of-Features Tagging) labels and how BoFT similarity, the pairwise similarity among users based on BoFT labels. And also the images are analyzed using BoFT, which annotates each image with a BoFT label [to annotate user generated images with non-user annotated labels, called BoFT labels]. The labeling process also helps to the connection discovery process.

(D)UPLOAD FILE SIZE LIMIT

In this module, the user uploading file size limit is configured. While the user uploading their image to share with their friends and or groups, this file size limit is referred if the file size is exceeded the limit, the user cannot able to upload.

(E)PRIVACY SETTINGS

The user sets privacy details using this module. The photo' details viewed by the group, relationship type and deny list are set in 'Privacy' table. These settings will be the default, but the user can change/modify the setting during uploading the photo also.

(G)UPLOAD PHOTO

The user uploads photo using this module. The photo' details such as title, description, photo image and users who can view the details are keyed in and saved in 'Photos' table.

(H)ADD FRIEND

The user adds friend details using this module, the username of the friend and the relationship type is selected from drop down list controls. The details are saved in 'Friends' table. During username selection, details such as common friends details are displayed.

PERFORMANCE ANALYSIS

USER SIMILARITY

The Table 1 describes the pair-wise similarity comparison among user profiles based on the number of occurrences of BoFT labels and this is calculated using the following formula: $S_{i,j} = S(L_i, L_j) = L_i \cdot L_j / | l_i| \cdot | L_j |$ where $L_i$and L_j are the set of BoFT (Bag of Features Tagging) labels of the shared image in the user profiles of users i and j, respectively.

S No	Total No of Requests Based on Similarity	No of Recommendations with Privilege Settings
1	1	0
2	3	1
3	1	0
4	1	0
5	2	2
6	2	1
7	3	3
8	2	1
9	7	5
10	1	1

Table 1:Recommendations with priveleged settings

No of Users	No of Images Shared	Similarity
50	100	20
60	150	30
70	250	40
80	315	45
90	392	50
100	470	60
110	540	70
120	615	80
130	692	90
140	767	100

Table 2: User Similarity

The Figure 1 shows the similarity of users with the related pairs,which are the pairs of users that are follower/followee and nonrelated pairs which are the pairs in which a follower/followee relationship does not exist between the two users. The similiarity of related and non-related pairs considered as class C and it can be defined as if the class C=1 if two users are related and if the class C=0 means non related pair.

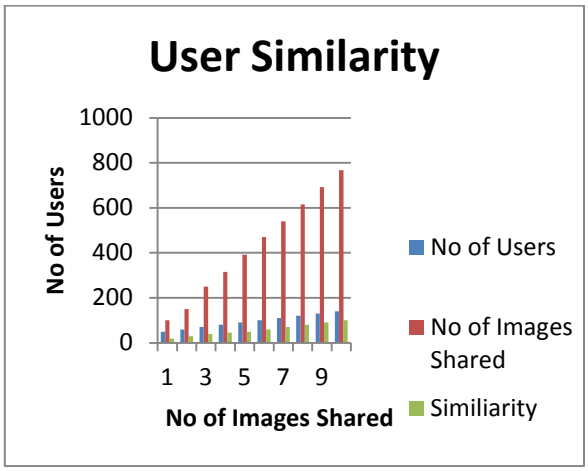


Fig 1: user similarity

The Table 2 showsthe user recommendation based on the user similiarity with the proposed privelege settings. The probability that two users are related pair or non related is calculated using the following formula: $S_{i,j} = S(L_i, L_j) = L_i \cdot L_j / |l_i| \cdot |L_j|$ and the recommendation is made based on the user probability defined as P(C=1/Si,j).

Table 2: Recommendations with Priveleged Settings
The Figure 2 shows the user recommendation based on the user similiarity with the proposed privelege settings. The recommendation is made based on the user probability defined as P(C=1/Si,j).

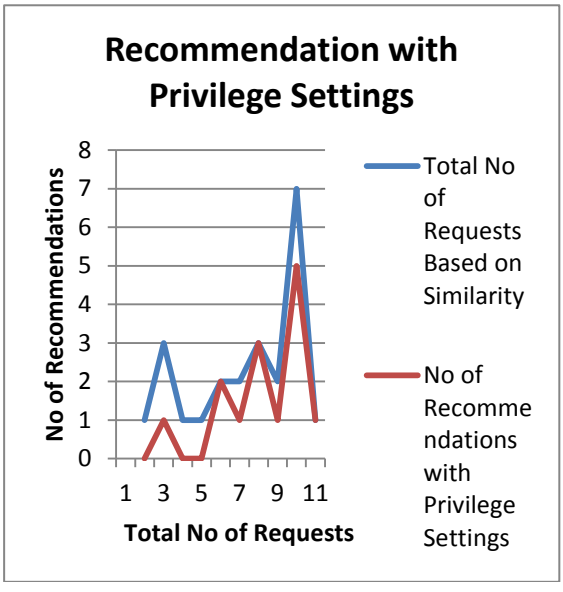


Fig 2: Recommendations with Priveleged Settings

VI. CONCLUSION

The system has been developed using the ASP.NET as its front-end tool and Microsoft SQL Server 2000 as its back-end with an attractive dialogs fashion and the entire user interface is attractive and user friendly and suites all the necessities lay down by the users initially. So user with minimum knowledge about the computers and the system can easily work with the system.

The proposed scheme is developed for verifying the connection between the levels of the privacy that each user will have to communicate will be shown in this proposed system. More over the proposed system will limit the file uploading and the rejected status and the accept status for the every users. This thesis limits the user from different category of sharing the data and to the group. This also ensures the connection between the users.

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