

Control of Photo Sharing in Groups on Online Social Networks

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Abstract—Photo sharing is an attractive feature which popularizes Online Social Networks (OSNs). This technique is used to address the issue and study the scenario when a user shares a photo containing individuals other than himself/herself (termed co-photo for short). Prevent privacy leakage in social networks is followed in order to identify the photos being shared. Demanding privacy setting may limit the number of the photos publicly available to train the recognition system. This recognition system is designed using users private photos in a way photo recognition will be done without leaking co-users privacy. We propose an Adaptive Privacy Policy Prediction (A3P) system to help users compose privacy settings for their images. We can examine the role of social context, image content, and metadata as possible indicators of user's privacy preferences. User propose a two-level framework which according to the user's available history on the site, determines the best available privacy policy for the user's images being uploaded. Our solution relies on an image classification framework for image categories which may be associated with similar policies and on a policy prediction algorithm to automatically generate a policy for each newly uploaded image, also according to user's social features. Computational complexity is reduced using consensus based method. This method is superior to other possible approaches in terms of recognition ratio and efficiency. This technique is implemented as a proof of concept Android application on Facebook's platform.

I. INTRODUCTION

Network Security

Network security is the security provided to a network from unauthorized access and risks. It is the duty of network administrators to adopt preventive measures to protect their networks from potential security threats.

Computer networks that are involved in regular transactions and communication within the government, individuals, or business require security. The most common and simple way of protecting a network resource is by assigning it a unique name and a corresponding password.

II. TYPES OF NETWORK SECURITY DEVICES

A. Active Devices

These security devices block the surplus traffic. Firewalls, antivirus scanning devices, and content filtering devices are the examples of such devices.

B. Passive Devices

These devices identify and report on unwanted traffic, for example: intrusion detection appliances.

C. Preventative Devices

These devices scan the networks and identify potential security problems. For example, penetration testing devices and vulnerability assessment appliances.

D. Unified Threat Management (UTM)

These devices serve as all-in-one security devices. Examples include firewalls, content filtering, web caching, etc.

E. Firewalls

A firewall is a network security system that manages and regulates the network traffic based on some protocols. A firewall establishes a barrier between a trusted internal network and the internet.

Firewalls exist both as software that run on a hardware and as hardware appliances. Firewalls that are hardware-based also provide other functions like acting as a DHCP server for that network.

Most personal computers use software-based firewalls to secure data from threats from the internet. Many routers that pass data between networks contain firewall components and conversely, many firewalls can perform basic routing functions.

Firewalls are commonly used in private networks or intranets to prevent unauthorized access from the internet. Every message entering or leaving the intranet goes through the firewall to be examined for security measures.

An ideal firewall configuration consists of both hardware and software based devices. A firewall also helps in providing remote access to a private network through secure authentication certificates and logins.

F. Hardware and Software Firewalls

Hardware firewalls are standalone products. These are also found in broadband routers. Most hardware firewalls provide a minimum of four network ports to connect other computers. For larger networks – e.g., for business purpose business networking firewall solutions are available.

Software firewalls are installed on your computers. A software firewall protects your computer from internet threats.

III. POLICY ON SOCIAL MEDIA

A. Image Sharing on Security Media

Social media is the two way communication in Web 2.0 and it means to communicate, share, and interact with an individual or with a large audience. Social networking websites are the most famous websites on the Internet and millions of people use them every day to engage and connect with other people.

Twitter, Facebook, LinkedIn and Google Plus seems to be the most popular Social networking websites on the Internet. Today, for every single piece of content shared on sites like Facebook—every wall post, photo, status update, and video—the up loader must decide which of his friends, group members, and other Facebook users should be able to access the content. As a result, the issue of privacy on sites like Facebook has received significant attention in both the research community and the mainstream media. Main objective is to improve the set of privacy controls and defaults, but we are limited by the fact that there has been no in- depth study of users privacy settings on sites like Facebook. While significant privacy violations and mismatched user expectations are likely to exist, the extent to which such privacy violations occur has yet to be quantified.

B. Content Sharing Website Management

Most content sharing websites allow users to enter their privacy preferences. Unfortunately, recent studies have shown that users struggle to set up and maintain such privacy settings. One of the main reason provided is that given the amount of shared information this process can be tedious and error-prone. Therefore, many have acknowledged the need of policy recommendation systems which can assist users to easily and properly configure privacy settings. In this project, the proposal has been made in Adaptive Privacy Policy Prediction (A3P) system which aims to provide users a hassle free privacy settings experience by automatically generating personalized policies.

C. Adaptive Privacy Policy Prediction in Social Media

The A3P system is comprised of two main building blocks: A3P-Social and A3P-Core. The A3P-core focuses on analyzing each individual user's own images and metadata, while the A3P-Social offers a community perspective of privacy setting recommendations for a user's potential privacy improvement. The interaction flow between the two building blocks to balance the benefits from meeting personal characteristics and obtaining

community advice. To assess the practical value of the approach, the built system prototype performs an extensive experimental evaluation. It is collected and tested over 5,500 real policies generated by more than 160 users. The experimental results demonstrate both efficiency and high prediction accuracy of the system. The additional experiments with a new data set collecting over 1,400 images and corresponding policies, are extended for analysis of the empirical results to unveil more insights.

IV. LITERATURE REVIEW

A. Tag, You Can See It! :Using Tags For Access Control In Photo Sharing

Users often have rich and complex photo-sharing preferences, but properly configuring access control can be difficult and time-consuming. In an 18-participant laboratory study, explore whether the keywords and captions with which users tag their photos can be used to help users more intuitively create and maintain access-control policies. It has been found that (a) tags created for organizational purposes can be repurposed to create efficient and reasonably accurate access-control rules; (b) users tagging with access control in mind develop coherent strategies that lead to significantly more accurate rules than those associated with organizational tags alone; and (c) participants can understand and actively engage with the concept of tag-based access control.

B. Understanding Privacy Settings In Facebook With An Audience View

Users of online social networking communities are disclosing large amounts of personal information, putting themselves at a variety of risks. The ongoing research investigates mechanisms for socially appropriate privacy management in online social networking communities. As a first step, examining is done in the role of interface usability in current privacy settings. This method reports on the first iterative prototype, where presenting an audience-oriented view of profile information significantly improved the understanding of privacy settings.

C. The Pviz Comprehension Tool For Social Network Privacy Settings

User's mental models of privacy and visibility in social networks often involve subgroups within their local networks of friends. Many social networking sites have begun building interfaces to support grouping, like Facebook's lists and "Smart Lists," and Google+ 's "Circles." However, existing policy comprehension tools, such as Facebook's Audience View, are not aligned with this mental model. In this paper, we introduce PViz, an interface and system that corresponds more directly with how users model groups and privacy policies applied to their networks. PViz allows the user to understand the visibility of her profile according to automatically-constructed, natural sub-groupings of friends, and at different levels of granularity. Because the user must be able to identify and distinguish automatically-constructed groups, we also address the important sub-problem of

producing effective group labels. We conducted an extensive user study comparing PViz to current policy comprehension tools (Facebook's Audience View and Custom Settings page). Our study revealed that PViz was comparable to Audience View for simple tasks, and provided a significant improvement for complex, group-based tasks, despite requiring users to adapt to a new tool.

D. *Prying Data Out Of A Social Network*

Preventing adversaries from compiling significant amounts of user data is a major challenge for social network operators. The difficulty of collecting profile and graph information from the popular social networking Website Facebook and report two major findings has been examined. First, it describes several novel ways in which data can be extracted by third parties. Second, it demonstrate the efficiency of the methods on crawled data.

E. *Image Classification: City Vs Landscape*

Grouping images into semantically meaningful categories using low-level visual features is a challenging and important problem in content-based image retrieval. Based on these groupings, effective indices can be built for an image database. It shows how a specific high-level classification problem (city vs. landscape classification) can be solved from relatively simple low-level features suited for the particular classes. The developed procedure qualitatively measure the saliency of a feature for classification problem based on the plot of the intra-class and inter-class distance distributions. The approach to determine the discriminative power of the following features: color histogram, color coherence vector DCT coefficient, edge direction histogram, and edge direction coherence vector. It is determined that the edge direction-based features have the most discriminative power for the classification problem of interest. A weighted k-NN classifier is used for the classification.

F. *Non-Parametric Kernel Ranking Approach For Social Image Retrieval*

Social image retrieval has become an emerging research challenge in web rich media search. The process addresses the research problem of text-based social image retrieval, which aims to identify and return a set of relevant social images that are related to a text-based query from a corpus of social images. Regular approaches for social image retrieval simply adopt typical text-based image retrieval techniques to search for the relevant social images based on the associated tags, which may suffer from noisy tags. The image retrieval technique presents a novel framework for social image re-ranking based on a non-parametric kernel learning technique, which explores both textual and visual contents of social images for improving the ranking performance in social image retrieval tasks. Unlike existing methods that often adopt some fixed parametric kernel function, the framework learns a non-parametric kernel matrix that can effectively encode the information from both visual and textual domains. Although the proposed learning scheme is transductive, it suggests some solution to handle unseen data by warping

the non-parametric kernel space to some input kernel function.

G. *Privacy Concerns For Photo Sharing In Online Social Networks*

As wireless networks flourish, internet users can access social network platforms (such as Facebook and Twitter) through personal electronic devices anywhere and anytime. However, because users often deploy social network platforms in a public network setting, a common concern remains about how to guarantee privacy for photo sharing. Although most platforms aim to protect such privacy, few are able to reach the goal. The work focuses on an interesting potential privacy risk, called the deletion delay of photo sharing, by pinpointing and investigating the risk's existence in some well-known social network platforms.

As with mobile devices when they reached 3G/4G connectivity, online social networks are now in the middle of a boom. Social network platforms provide a convenient human machine interface for Internet users, making it simple to share unlimited-format information (such as photos and videos) with friends anywhere and anytime. Additionally, users can enjoy real-time and free chats with others, post the latest status updates/check-ins, and express opinions about current social hot spots. Since social networking's introduction, it shows several hugely successful platforms emerge (including Facebook, Twitter, and Instagram).

H. *Retagging Social Images Based On Visual And Semantic Consistency*

The tags on social media websites such as Flickr are frequently imprecise and incomplete, thus there is still a gap between these tags and the actual content of the images. This method proposes a social image "retagging" scheme that aims at assigning images with better content descriptors. The refining process is formulated as an optimization framework based on the consistency between "visual similarity" and "semantic similarity" in social images. An effective iterative bound optimization algorithm is applied to learn the optimal tag assignment. In addition, as many tags are intrinsically not closely-related to the visual content of the images, it employs a knowledge-based method to differentiate visual content related from unrelated tags and then other constraint is the tagging vocabulary of the automatic algorithm within the content related tags. Experimental results on a Flickr image collection demonstrate the effectiveness of this approach.

Online media repositories allow users to upload their media data and annotate them with freely-chosen tags. Despite the high popularity of tagging social images manually, the tags are often imprecise, biased and incomplete for describing the content of the images, which have significantly limited the performance of social image search and organization.

I. *Fast Radial Symmetry For Detecting Points Of Interest*

A new feature detection technique is presented that utilizes local radial symmetry to identify regions of interest

within a scene. The transformation undergone is significantly faster than existing techniques using radial symmetry and offers the possibility of real-time implementation on a standard processor. The new transform is shown to perform well on a wide variety of images and its performance is tested against leading techniques from the literature. Both as a facial feature detector and as a generic region of interest detector the new transform is seen to offer equal or superior performance to contemporary techniques which requiring drastically less computational effort.

Automatic detection of points of interest in images is an important topic in computer vision. Point of interest detectors can be used to selectively process images by concentrating effort at key locations in the image, this can identify salient features and compare the prominence of such features, and real-time interest detectors can provide attentional mechanisms for active vision systems.

J. *Content-Based Image Retrieval: Theory And Applications*

Advances in data storage and image acquisition technologies have enabled the creation of large image datasets. In this scenario, it is necessary to develop appropriate information systems to efficiently manage these collections. The commonest approaches use the so-called Content-Based Image Retrieval (CBIR) systems. Their goal is to support image retrieval based on content properties (e.g., shape, color, texture), usually encoded into feature vectors. One of the main advantages of the CBIR approach is the possibility of an automatic retrieval process, instead of the traditional keyword-based approach, which usually requires very laborious and time-consuming previous annotation of database images.

K. *Image Retrieval: Ideas, Influences, And Trends Of The New Age*

Great interest and a wealth of promise in content-based image retrieval as an emerging technology has been advised. While the last decade laid foundation to such promise, it also paved the way for a large number of new techniques and systems, got many new people involved and triggered stronger association of weakly related fields. The survey almost detected 300 key theoretical and empirical contributions in the current decade related to image retrieval and automatic image annotation and in the process discuss the spawning of related subfields. The significant challenges involved in the adaptation of existing image retrieval techniques to build systems that can be useful in the real world. In retrospect of what has been achieved so far, it also conjecture what the future may hold for image retrieval research.

L. *Connecting content to community in social media via image content, user tags and user communication*

This paper develop a recommendation framework to connect image content with communities in online social media. The problem is important because users are looking for useful feedback on their uploaded content, but finding

the right community for feedback is challenging for the end user. Social media are characterized by both content and community. Hence, in our approach, we characterize images through three types of features: visual features, user generated text tags, and social interaction (user communication history in the form of comments). A recommendation framework based on learning a latent space representation of the groups is developed to recommend the most likely groups for a given image. The model was tested on a large corpus of Flickr images comprising 15,689 images.

M. *Analysing Facebook features to support event detection for photo-based Facebook applications*

Facebook witnesses an explosion of the number of shared photos: With 100 million photo uploads a day it creates as much as a whole Flickr each two months in terms of volume. Facebook has also one of the healthiest platforms to support third party applications, many of which deal with photos and related events. While it is essential for many Facebook applications, until now there is no easy way to detect and link photos that are related to the same events, which are usually distributed between friends and albums. In this work, we introduce an approach that exploits Facebook features to link photos related to the same event. In the current situation where the EXIF header of photos is missing in Facebook, we extract visual-based, tagged areas-based, friendship-based and structure-based features. We evaluate each of these features and use the results in our approach. We introduce and evaluate a semi-supervised probabilistic approach that takes into account the evaluation of these features. In this approach we create a lookup table of the initialization values of our model variables and make it available for other Facebook applications or researchers to use. The evaluation of our approach showed promising results and it outperformed the other the baseline method of using the unsupervised EM algorithm in estimating the parameters of a Gaussian mixture model.

N. *Multimedia Semantics: Interactions Between Content and Community*

This paper reviews the state of the art and some emerging issues in research areas related to pattern analysis and monitoring of web-based social communities. This research area is important for several reasons. First, the presence of near-ubiquitous low-cost computing and communication technologies has enabled people to access and share information at an unprecedented scale. The scale of the data necessitates new research for making sense of such content. Furthermore, popular websites with sophisticated media sharing and notification features allow users to stay in touch with friends and loved ones; these sites also help to form explicit and implicit social groups. These social groups are an important source of information to organize and to manage multimedia data. In this article, we study how media-rich social networks provide additional insight into familiar multimedia research problems, including tagging and video ranking. In particular, we advance the idea that the contextual and

social aspects of media are as important for successful multimedia applications as is the media content. We examine the inter-relationship between content and social context through the prism of three key questions. First, how do we extract the context in which social interactions occur? Second, does social interaction provide value to the media object? Finally, how do social media facilitate the repurposing of shared content and engender cultural memes? We present three case studies to examine these questions in detail. In the first case study, we show how to discover structure latent in the social media data, and use the discovered structure to organize Flickr photo streams. In the second case study, we discuss how to determine the interestingness of conversations—and of participants—around videos uploaded to YouTube. Finally, we show how the analysis of visual content, in particular tracing of content remixes, can help us understand the relationship among YouTube participants.

O. Rotationally Invariant Texture Based Features

Content-based retrieval is ultimately dependent on the features used for the annotation of data and its efficiency is dependent on the invariance and robust properties of these features. For texture based features an important form of invariance is rotational invariance. In this paper novel rotationally invariant texture based features are introduced that are extracted from a Polar Fourier Transform (PFT). The PFT is similar to the Discrete Fourier Transform in two dimensions but uses transform parameters radius and angle rather than the Cartesian co-ordinates. The PFT is discretised appropriately across the angular and radial frequency space with the transform magnitudes forming the rotationally invariant features. These features although rotationally invariant, capture the angular distribution together with the radial distribution of frequency within texture. Preliminary results show the method to give better results than rotationally variant and invariant Gabor filter schemes.

The ability to effectively retrieve images or video according to their content is still an unfulfilled goal for multimedia applications and therefore a currently active research area. Content-based retrieval is dependent on the features used for the annotation of data and its efficiency is dependent on the ability of extracted features to facilitate meaningful responses to a range of queries. For texture based features, this ability is to a large extent, dependent on the invariance and robust properties of the features. These properties include the invariance to scale, rotation, illumination transforms and robustness against noise. Inclusion of these properties should ensure that the features capture a more abstract representation of the texture separate from the circumstances in which it is found. This paper focuses on texture features that have been developed to be invariant to a transformation of a texture by rotation. Rotational invariance of texture features can be separated into two different classes: Isotropic and Anisotropic. Isotropic rotational invariant features are formed from averaged measures of some property (such as frequency content) in all directions.

P. Privacy-aware image classification and search

Modern content sharing environments such as Flickr or YouTube contain a large amount of private resources such as photos showing weddings, family holidays, and private parties. These resources can be of a highly sensitive nature, disclosing many details of the users' private sphere. In order to support users in making privacy decisions in the context of image sharing and to provide them with a better overview on privacy related visual content available on the Web, we propose techniques to automatically detect private images, and to enable privacy-oriented image search. To this end, we learn privacy classifiers trained on a large set of manually assessed Flickr photos, combining textual metadata of images with a variety of visual features. We employ the resulting classification models for specifically searching for private photos, and for diversifying query results to provide users with a better coverage of private and public content. Large-scale classification experiments reveal insights into the predictive performance of different visual and textual features, and a user evaluation of query result rankings demonstrates the viability of our approach.

With increasing availability of content sharing environments such as Flickr, and YouTube, the volume of private multimedia resources publicly available on the Web has drastically increased. In particular young users often share private images about themselves, their friends and classmates without being aware of the consequences such footage may have for their future lives. Photo sharing users often lack awareness of privacy issues. A recent study revealed that more than 80% of the photos publicly shared by young people are of such a private nature that they would not show these images to their parents and teachers. The popular Facebook platform allows its users not only to publish photos, but also to mark the names of the depicted people. In this way, even people who did not publish any compromising information, can leave discoverable footprints on the Web.

Q. PESAP: A Privacy Enhanced Social Application Platform

Nowadays, social networking sites provide third party application developers with means to access their social graph, by providing a social application platform. Through their users, these developers acquire a significant set of personal information from the social graph. The current protection mechanisms, such as privacy policies and access control mechanisms fall short on protecting the privacy of the users. In this paper we present a framework for a privacy enhanced social application platform, called PESAP, that technically enforces the protection of the personal information of a user, when interacting with social applications. The framework is based on two pillars: anonymization of the social graph and secure information flow inside the browser. PESAP is targeted to be as compatible as possible with the current state-of-the-art design of social application platforms, while technically enforcing the protection of user privacy. We evaluate this compliance, based on a classification of applications in different categories.

Today social networking sites are ubiquitous. They host an important part of the on-line communication and contain the majority of personal information that is available on the web. Ever since Facebook launched their application development platform in May 2007, social applications have been an important evolution in the world of social networking sites. Almost every major social networking site provides means to access data in their social graph. Third party applications spread through the on-line communities and the popularity of these social applications keeps increasing. Although they might be hard to configure and adjust to one's wishes, users usually trust the social networking sites to respect their privacy settings. Trusting Facebook, Google, and other big social network providers to keep to their policies and to respect your privacy, is hard to avoid when using social networking sites. Trusting each third party application developer to keep to the policies and to respect your privacy is more difficult to justify. A 2010 Wall Street Journal article illustrates the problem by showing that many of the most popular Facebook applications were (perhaps unknowingly) transmitting identifying information to advertising and tracking companies.

V. SYSTEM ANALYSIS

A. Existing System

The existing concept of privacy suites which recommend to users a suite of privacy settings that "expert" users or other trusted friends have already set, so that normal users can either directly choose a setting or only need to do minor modification.

Similarly, its undergone in machine-learning based approach to automatically extract privacy settings from the social context within which the data is produced.

The existing system shows how to predict a user's privacy preferences for location-based data (i.e., share her location or not) based on location and time of day.

Then approach in privacy wizard helped users to grant privileges to their friends. The wizard asks users to first assign privacy labels to selected friends, and then uses this as input to construct a classifier which classifies friends based on their profiles and automatically assign privacy labels to the unlabeled friends.

More recently, the existing system based on the keywords and captions with which users tag their photos can be used to help users more intuitively create and maintain access-control policies.

B. Drawbacks Of Existing System

1. Existing proposals for automating privacy settings appear to be inadequate to address the unique privacy needs of images.
2. Due to the amount of information implicitly carried within images, and their relationship with the online environment wherein they are exposed.
3. User details aren't protected.

4. It leaks users privacy if they are allowed to post, comment and tag a photo freely without protecting them.
5. Certain amount of information is implicitly carried out within images, and their relationship with the online environment wherein they are exposed.
6. Individual identification for non-users of social networks weren't provided.

C. Proposed System

The proposed system used an Adaptive Privacy Policy Prediction (A3P) system which aims to provide users a hassle free privacy settings experience by automatically generating personalized policies.

The A3P system handles user uploaded images, and factors in the following criteria that influence one's privacy settings of images: The impact of social environment and personal characteristics. Social context of users, such as their profile information and relationships with others may provide useful information regarding user's privacy preferences.

For example, one may upload several photos of his kids and specify that only his family members are allowed to see these photos. He may upload some other photos of landscapes which he took as a hobby and for these photos, he may set privacy preference allowing anyone to view and comment the photos.

Users may have drastically different opinions even on the same type of image.

In light of these considerations, it is important to find the balancing point between the impact of social environment and users' individual characteristics in order to predict the policies that match each individual's needs.

Moreover, individuals may change their overall attitude toward privacy as time passes. In order to develop a personalized policy recommendation system, such changes on privacy opinions should be carefully considered. The role of image's content and metadata. In general, similar images often incur similar privacy preferences, especially when people appear in the images.

Analyzing the visual content may not be sufficient to capture user's privacy preferences. Tags and other metadata are indicative of the social context of the image, including where it was taken and why, and also provide a synthetic description of images, complementing the information obtained from visual content analysis.

D. Advantages Of Proposed System

1. Our proposed work helps users to automate the privacy policy settings for their uploaded images efficiently.
2. Providing validation for photo sharing in groups.
3. Only users who are given accessibility can have access over the photos being shared among groups.
4. Only those accessible users can download, view and have access to it.
5. Others who aren't provided access but are of same group can't have access to the photo being shared.

E. FIGURES



Fig. 1. Registration Page



Fig. 4. Home Page



Fig. 2. Upload Image

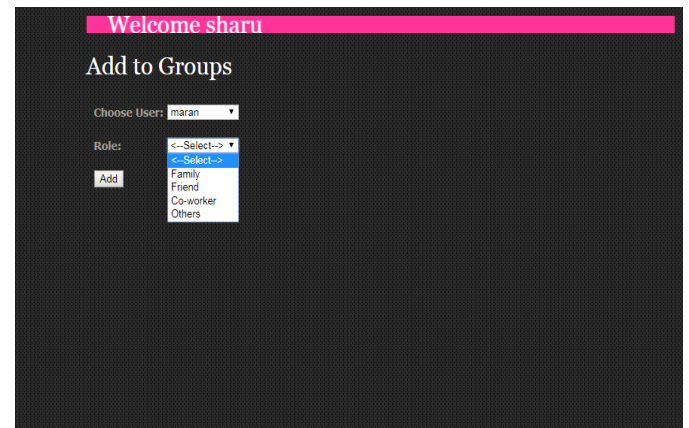


Fig. 5. Output Page

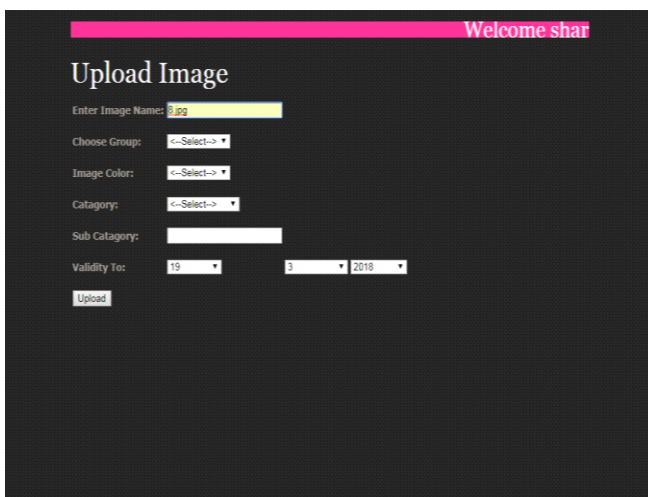


Fig. 3. Add members to group

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