USABILITY AND SECURITY ASPECTS OF SOCIAL NETWORK SITES (SNS)

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Abstract
The rising level of Social Network Sites (SNS) is incredible. An SNS is a network system which offers quality services like connecting users and providing a platform to establish communications among the individuals of common interest. The paper aims at providing technical as well as social aspects akin to 'Security Vs Usability' in restricted user forums within a Social Network Site (SNS). As per surveys conducted in US, security of data plays a vital role in restricted user groups of SNS. Therefore authentication & security processing techniques become important to protect the data from unauthorized access into an SNS. However, as far as a common user is concerned, when security is given a higher priority by the system, the usability for the user itself is then affected. This has been observed from survey conducted in South India. Conducive user environment is preferred particularly for SNS. The paper presents security features, derived from technical study and usability issues, obtained from Social survey in restricted user forums of a selected SNS that has been experimented and validated. The paper also presents results obtained from social survey study that are based on feedback analysis conducted on security as well as usability issues from user respondents (based on purposive sampling).The results and the findings will be of immense use to SNS designers and researchers.

Keywords:
Security, Usability, Social Network Forums, Social Survey, Authentication

1. INTRODUCTION

Social Network Sites (SNS) is an e-social space where people can connect communicate and submit and share contents of interest with others. They may contact and establish a relationship with the people even they didn't meet before [1]. Now-a-days many SNS have entered the business and try to become popular. It is also welcome by the individuals as SNS is considered to be a useful media for social activities.

A group of users fallen to specific interest, ages and social communities may be formed for restricted user forums within SNS. A forum can be formed by a group of people have special interest. They can discuss their views, ideas, and collaborate with each other in that Forum. Day by day the growth of the SNS and their users become enormous, and its restricted user forums have gained popular.

Normally the content of the usual website consists of details about an organization provide mechanisms to (or) include features to do transaction (like banking site) or view the contents (like tourism website). But in SNS that are primarily organized around user's profiles and those that are organized data, pictures, videos and information of and about the users of SNS. The availability of such personal information may be convenient from user's point of view. At the same time it might lead to several risks that are privacy related. For example: revealing the information about authorized children users to unauthorized persons or linking them un-intentionally as celebrities will affect the ethical life. It may lead to social problems. From commercial point of view many SNS are promoting restricted user forums. These user information are deposited and maintained by the owner of SNS.

The depository of information may be considered as a data source for customer analysis. Since the likes and dislikes and the seasonal attraction of the individuals are also available in the SNS, many intruders may try to become an authorized user (unauthentic ally). Dynamic advertisement notifications may be automatically forwarded to the users based on their tastes identified through their profiles. This would affect their privacy.

The SNS sites yield a huge revenue through E-marketing [1] that would attract many users to join forums within SNS. These users may be novice like children or professionals. Normally the basic structure of the SNS has a provision to hold member's profile, network for friends and provision to establish a Group.

A user profile is represented as a personal webpage. It may also be considered as the representation of an individual in the web. Then each individual may build his/her own network of personal relations (Friends).

By this way social Network sites (SNS) allow users to express their individuality and meet people with similar interest. Even though the basic structure of each SNS is similar, each SNS has unique applications. The profile of the members include the fields like username photos, E-mail address, date of the birth, workplace, phone no, address holiday plans and hobbies. Such information might invite intruders voluntarily. Since the personal and sensitive information provided by the user would either knowingly or unknowingly leads to privacy violation.

This show on one hand users want to protect their personal information against mis- use by intruders [2]. Face book is one such famous SNS which would provide a privacy setting option. If the level is very low then it is like providing no protection at all. If the privacy setting is made as a high value, by default, then it would affect those users in the usability. It is reported that even some newly registered users couldn't understand the steps to setup the privacy settings [10]. On the other hand they need conducive usability without much difficulty.

2. RELATED WORK

As per the author [3] privacy tools in SNS are not flexible. It provides access control in profile wise. User may make his profile as public or private. There is no provision for granular level of access control [3].It is also very difficulties to predict what others reveal information about oneself.

The diameter of the SNS coverage area is getting gradually increased, thus the number of friends for users is also getting increased day by day.

Similarly users may find interesting in becoming members in more than one group. This would increase the usage of personal information by other members and intruders too.

The revealing of personal information like phone no, photos taken on specials occasions of the user's lifetime are considered to be a prime factor which has direct impact on the user's privacy. Privacy is defined as a trial made for unauthorized access of personal information. The 'Friends network' in SNS normally includes a member who never met earlier. SNS users are allowed to create their account in the name of their desired celebrity characters such as novel authors or Movie actors or simply through their nick names [11]. It is always possible to strengthen the verification mechanism (to ensure authentication) at the time of registration. But it is very difficult to monitor and avoid the registration with fake identity at the time of usages. This may lead to misrepresentation of authorized users. With false identity few intruders may try to target authorized children or teenage users. Even criminals and digital robbers may represent him and try to become an authorized user. Therefore security plays a vital role in forums of SNS.

Few security threats out of many have been discussed by author [4].The prime factors may be derived as:

- The personal information about users can be downloaded and stored by third party.
- Unwanted linkage to personal data may become vulnerable.
- The data can be collected in distinct association like friend of friend.

The personal information of the users in their profile becomes a data warehouse for commercial vendors. Even the user's profiles are harvested by automated tool [9].Some tag can be added to user's profile without the knowledge of the users by their friends. It may not intentionally happen. It might be taken as a fun measure. In Some occasions, it may affect the image of the user.

For the last case, consider an example where some comments are passed on by user B about a sensitive information provided to B by A. Since User B is considered as a close friend to A, even the sensitive information may be shared. But the comment released by B can also be viewed and shared by all other friends of B. Thus information can be shared and data collected in distinct association like Friend of Friend may affect the privacy of the user.

There are also many potential threats to privacy associated with user forums of SNS. Such as identity theft and disclosure of personal information. Since SNS has huge volume of data and too many friends it is found to be very difficult for the users to control the access made by other users.

Social network are socially usable in network to maintain the privacy of the user and their personal information stored in it is a big challenge. However the SNS owners eventually create a wealth of this information. Even if a user ceases to be an active member his personal informantion, when not deleted from the SNS pages, become a personal threat. Since data are shared in online, it may lead to users by creating as if the control on the data is lost. This could be eradicated if the privacy preserving mechanism is properly provided in SNS.

As per the authors [3],the data and users who access these information may be divided into groups. Various access rights-mapping exists between the type of user and data domain.

Even though it is considered as a granular level of access rights, it is actually meant as a security measure to preserve the privacy. The mindset of the people as per the usability survey, even in the case of, the simple password based authentication also, the expected efficiency of the security process is high. Most of the users want instantaneous access. They don't like to wait for even few seconds to get into their system to access the data.

Such type of complicated and lengthy privacy preserving procedure with a view on security point of view has direct downside impact on usability point of view [5]. The usability of Security measures implemented in a system must meet the user satisfaction.

3. PROPOSED WORK

As usability and security equally play vital roles in private forums within SNS, it is proposed to conduct (to design) an experiment with two private user groups namely i) Adult forum and ii) Children forum in a selected SNS for the proposed study. These two private restricted forums have been introduced within an SNS known as "CHOCUT", which have been developed and made available particularly for South Indian users [6]. For the purpose of providing a robust security, a signature based authentication has been introduced. In addition, for the purpose of study on 'Security Versus Usability', social surveys have also been designed and conducted on certain aspects for these two chosen groups. The main factor which decides the success of an SNS is the degree to which it reflects the social culture of a specific region. This was administered on selected South Indian user respondents. The results are compared with other published [7] works. Although technology can provide high level of security protection, privacy laws and policies in SNS security systems are well behind the developments in technology [8].

3.1 USABILITY Vs SECURITY

Two restricted user forums were developed in a private SNS known as "CHOKUT", one for adult and the other for children education groups. 68 respondents from the adult user group and 24 respondents from children user groups have been identified. Validated questionnaires have been designed and administered on these selected respondents.

3.1.1 On Privacy Issues:

SNS is a website which provides a virtual community for likeminded people. Members can create their own online profile with biographical data, pictures likes and dislikes and any other information they choose to post. They communicated with each other in a restricted forum as a peer to peer by exchanging the messages. Since the popularity of the social network is rising, there might be possible for breach of security on sites. Privacy issue occurs when one try to access private information which is restricted for common access.

Surveys in the US [8] reveal growing concern about the use of personal information. The intensity of concern is not that severe with south Indian users as observed from the social survey conducted and presented in this report. The results as obtained on privacy issues are compared with other published works [8] as well. The results on four questions related to privacy concerns have been exhibited in Table.1 and also the comparison of results with other published works in Fig.1 through 4. The questionnaire is enclosed in the Appendix section of this paper.

Total number of respondents: **68**

Category: **Adults**

Table.1. Survey Results

Sl. No.	Question	Y (Yes)	N (No)	% of Y
1	Q1 (Fig.1)	34	34	50%
2	Q2 (Fig.2)	7	61	10%
3	Q3 (Fig.4)	51	17	75%
4	Q4 (Fig.3)	8	60	12%

The results compare users of two socially and culturally diversified regions, but who use SNS. Fig.1 presents unrestricted usage of the users' information by the system. Fig.2 represents the results that show whether technology would be a threat to the exposures of the personal information of the users. Fig.3 shows the results on the loss of (already lost) the personal information of the users. Fig.4 shows the results of the need for prior approval from the users before using their personal information.
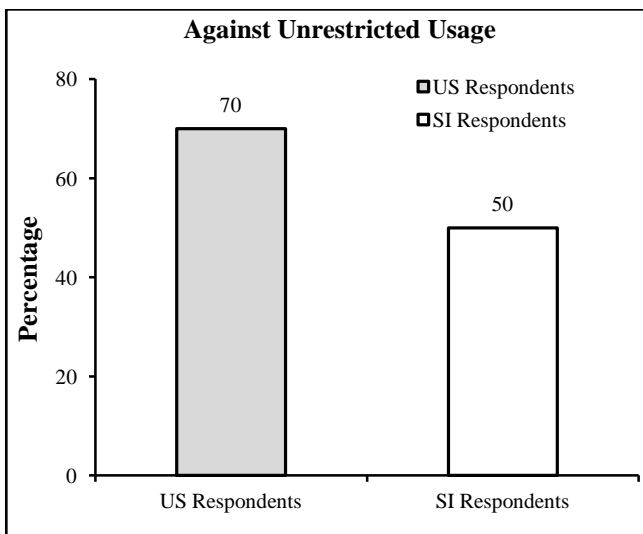

Fig.1. On unrestricted usage of personal data

3.1.2 Observation on Privacy Issues:

While 70% of US respondents are against unrestricted usage of their data, only 50% of South Indian respondents are against the unrestricted usage (Fig.1). This may be due to the fact that when at least 78% of US respondents have reported that they have already lost their personal information, only 12% of South Indian respondents have reported that they have lost their personal information (Fig.3). When 78% of US respondents have expressed that Technology may be a threat to privacy, only 10% of the South Indian respondents have expressed the same

(Fig.2). Since inclusion of any simple application in any user's profile of 'Face book' may provide complete access to user's personal data [3]. However 93% of US respondents and 75% of South Indian respondents have uttered that a prior approval is necessary before using their personal information (Fig.4).
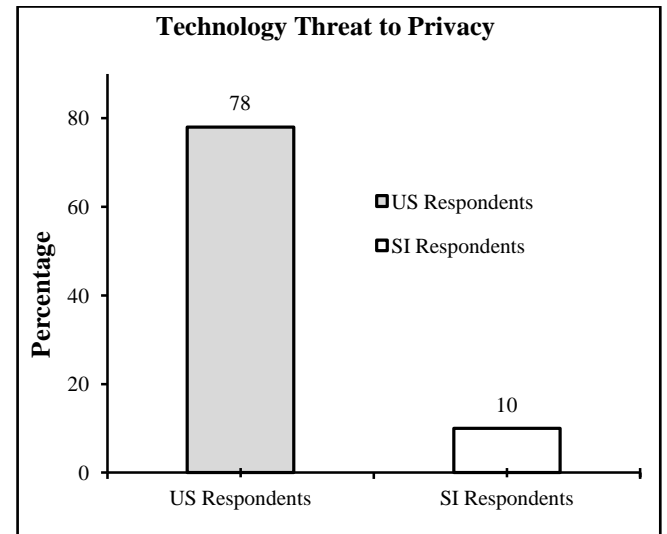

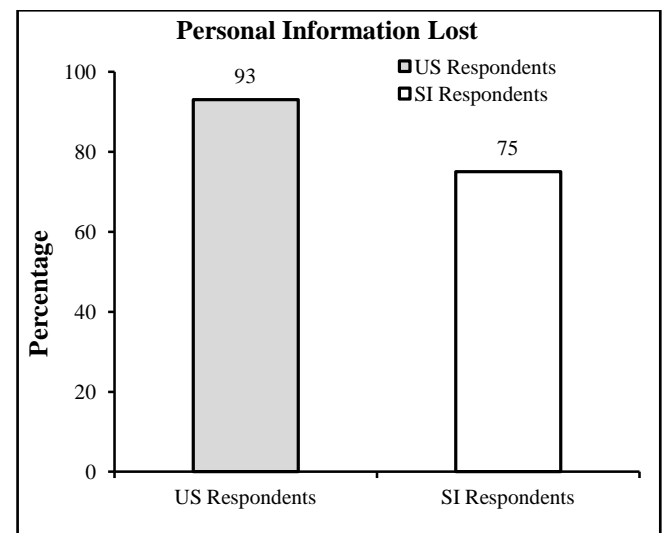Fig.2. Technology would be a threat to Privacy

Fig.3. Already lost control of personal information

3.1.3 On Usability Issues:

There must be a right balance between security and usability [5]. The results as obtained on usability issues are presented through three direct questions that were administered on the same selected respondents. They are

i. What would be the preference of the user on mandatory requirement of changing their passwords once in a) 15 days; b) 90 days and c) No restriction at all.

ii. Which password option out of the following would be preferred by the user: a) 10 characters with at least one complex abnormal character; b) 8 characters with at least one simple but abnormal character and c) No restriction at all.

iii. What Login/Pass word processing time duration allowed:
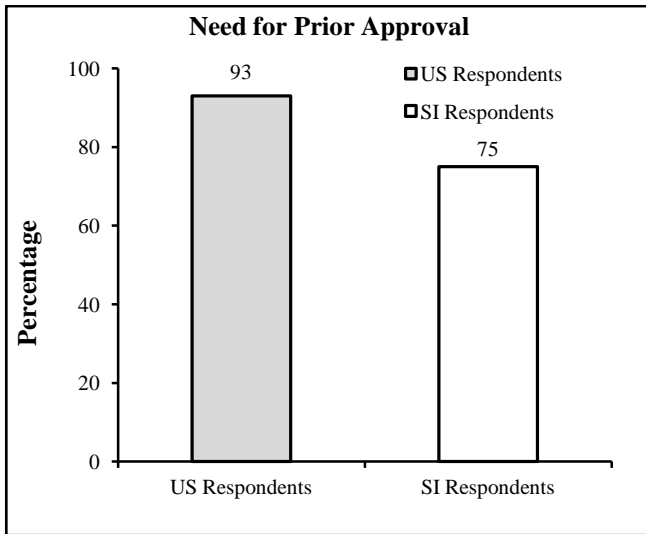a) Minimum 1 minute; b) Maximum 15 Seconds and c) Almost Instantaneous.

Fig.4. Prior approval needed in using personal information

The 68 respondents were administered with these questions. The results obtained from the respondents on these three questions related to usability concerns have been exhibited in Fig.5.

The sampling has been assumed as purposive or convenient sampling. All the respondents were at one stage were users of the 'CHOKUT' SNS. All the users (respondents) were novice users of a restricted forum created exclusively for the purpose of research. All the respondents were South Indian users. The results (values) are restricted to usability and security aspects only. Other responses on social aspects are beyond the scope of this paper.
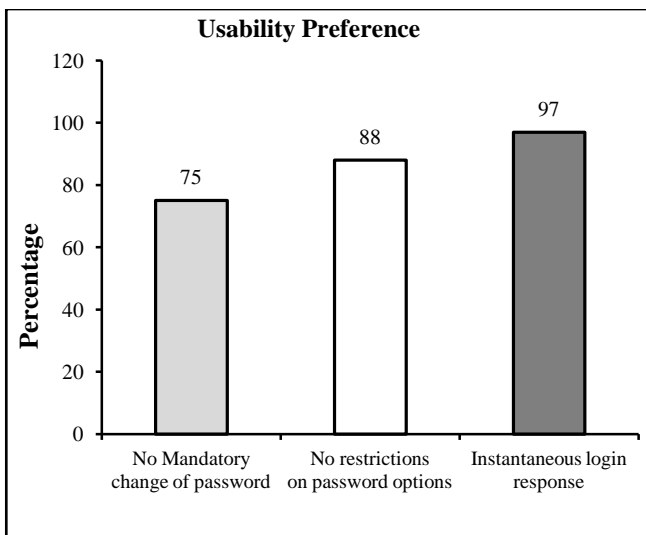

Fig.5. Usability preferences

3.2 OBSERVATION ON USABILITY ISSUES

It is clearly demonstrated that virtually all the respondents have expressed that the system should be freely usable (Fig.5).

The privacy setting interface may be designed to provide previews of profiles for the setting option selected by the user instead of the text based feedback. It will improve the confidence of the user while opting for privacy settings. The password [12] or signature based authentications meant for protection. However security measures should not be a hindrance to the usage and the system response need to be as instantaneous as possible. Hence the paper concludes both these aspects need to be considered in the design of an SNS.

4. CONCLUDING REMARKS

Privacy on personal information in SNS while seen as the right of individuals to control about themselves is of a more serious concern in US compared with South Indian users of restricted forums within an SNS. Since in the most popular SNS like 'Face book' of the US, the newly installed application not only lute the information of the user in which it is installed, but it also tries to trace their Network [Privacy protection Issues in SNS]. Users of South Indian restricted user forums of SNS opt for unrestricted password options. They also need an almost instantaneous access to their sites. While security concerns play vital roles in the authentication process in restricted forums of SNS, usability is severely lost. Since SNS provide the infrastructure as a free web space to store and share the information digitally. It becomes a part of daily life of most of the individuals. It also is taken as a way to generate a revenue by another commercial group. It cannot be ignored because of its privacy related issues. Hence there should be a right balance between both the security and usability aspects in restricted forums of SNS.

APPENDIX

Privacy Security Survey
SPECIFIC PURPOSE ADULT PRIVATE USERS GROUP
(Restricted Pages within 'CHOKUT' Social Network)

Personal/Private Data would consist of, your: Full Name; Current/Contact Address; Office Address; Permanent Address; Phone Numbers (Office/Residence/Mobile); e-Mail Address; Date of birth; Income; Caste/Community; Educational Background; Marital status; Food preference; Habits; Hobbies etc.,

Note: To become a member of the 'Specific Purpose Adult Private Users Group', you may have to provide all the above data with documentary evidence that would strictly be kept confidential.

Please provide answers (tick appropriate character) to the following questions on the above personal/private data of yours.
Q1: Would you mind sharing your Personal/Private data with public? (Y / N)
Q2: Do you feel Technology would be a threat to your Personal/Private data? (Y / N)
Q3: Will you insist for your written approval before we use your Personal/Private data for Non-commercial purposes? (Y / N)

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Q4: Have you ever (already) experienced anytime in having leaked out of your Personal/Private data? (Y / N)

Q5: Would you prefer to specify a fake name as User/Login name for/within the group? (Y / N)

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