CHAPTER I

INTRODUCTION

1.1 CRITICAL ISSUES IN MINOR USER GROUPS OF SOCIAL NETWORK SITES

Social Network Site (SNS) in general, attracts individuals to align themselves into specific groups according to their taste and requirements. While there are a number of SNS sites that focus on specific interests, there are others that do not. The SNSs without a main focus are often referred to as "traditional" SNSs and usually have open memberships. The use of SNS nowadays is extended to school library users and is increasingly prevalent to communicate with potential general community library users as well, apart from extending the services rendered by individual school libraries. From 2009 to 2012 the online school teenagers who used SNS, increased from 55% to 73% [Social Networks and Education - 2012]. Recent studies have shown that social network services provide opportunities within professional education, curriculum education, and learning, particularly to school children (minor users). Because of this social nature, SNSs and their educational uses are of interest to many researchers. Apart from such minor users of SNS (abbreviated in the thesis as, ‘Minor User Groups’ of SNS or MUG), if an individual registers with a MUG, he/she begins to socialize with many children. Socialization includes possibilities of reading the profile pages of minors and also trying to contact them. Thereby data theft and viruses are on the rise (chapter II). The most prevalent danger though often involves online predators or individuals who claim to be someone that they are not.

Like-minded users of SNSs, not only align themselves, but also trend to establish groups under restricted user forums within an SNS. Since the commercial success of SNS is now eminent, restricted forums within SNS are gaining popularity. But the success of SNS depends on the number of users it attracts through its site design and the user behavior. Hence the design aspect of SNSs has become an important issue. In any case, user information and personal data are invariably obtained and preserved by the service providers of any SNS. The communications
between these restricted users are passed on as messages and thus become vulnerable, as disclosures to digital friends may lead to violation of privacy causing security risks [Helen Giggins and Ljiljana Brankovic 2008]. Privacy is commonly (reported results were obtained from users of developed nations) termed as the right of individuals to control information about themselves [Doug Fox and Shiva Naidu 2009]. Users of SNS, particularly children share photos, videos, and communicate via SNS. Because of this socially usable nature, usability apart from security plays an important role in SNS. Unfriendly usability was a significant reason for not returning to SNS by many users [Ljiljana Brankovic1 and Vladimir Estivill-Castro]. Some of the usability issues are: cumbersome login procedures, confusing terminologies, inadequate feedbacks, error messages and improper links. Therefore creation of private and restricted user forums within SNS, where protection of individual (personal) information must be guaranteed is becoming another important issue. On one hand, if the security issue is brought to the centre stage, the usability on the other hand might suffer. Therefore it is important to find the right balance between security and usability. As restricted user forums, particularly of children users within SNS attract more regional users security akin to usability is thus needed to be determined through local social surveys.

Apart from security intense design of MUGs of SNS, the network should also be used in a controlled and open way manner, with coordinated campaigns to educate children along with parents and teachers [Social Networks and Education - 2012]. However, since it is often easy to become someone’s friend under false pretences, the protection of personal data may not be preserved fully. Therefore it will become necessary to encourage security conscious development practices and policies. Hence a stronger authentication and access-control might be needed. Another problem on usability that plagued most participants of SNS was initial login procedures of an SNS. When users were first logged into their accounts (provided by a dummy account), most would enter their information in the “sign up” section itself and not the “login” section of the page. This procedure could be contributed in the design stage of the page. The actual “login” area wouldn’t have been designed to draw the attention of the user, unlike the “sign up” section. This could become another issue.
From the above debates, two important inferences could be drawn: i) Significance of ‘Usability’ and ii) Importance of ‘Data security’ of MUGs of SNS.

1.1.1 Basis of Local Social Conditions for Dealing with Issues

There is an increasing public concern about the individuals’ information. Privacy is commonly seen as the right of individuals to control information about them. There seems to be general privacy issues: secondary use of the personal information, handling misinformation, and granulated access to personal information. They demonstrate that existing privacy laws and policies are well behind the developments in technology, and no longer offer adequate protection, particularly for children SNS users. As this demands for countrywide laws, problems and issues, and the research for them need to be tackled locally, say for India. Therefore it is clear that both the users of restricted forums of SNS as well privacy laws need to concentrate from local region point of view.

Determining online consumption patterns for Indians using SNS have become important [Indian Scenario of SNS, Vizisense, 2010]. A study was conducted among 90,000 panelists. This study has served as an important pool of information. It has provided a significant insight into their online behavior which might also become an important tool for localized social media designers. The report tries to capture the demographic attributes such as age, occupation and geography while analyzing particularly women and children behaviour across top categories. Encouraging news is that out of the 50 million active Indian internet users, 22% are women and children. The top three online activities for Indian users are social networking, email and search. However, social networking interestingly gets higher page views than e-mail, indicating more engagement and online conversations.

In view of the above narrations, the introduction may be commenced with the following specific issues of research interests, so as to arrive at a prelude before defining the specific research problem:
1. SNS is gaining popularity in India and it is intended to grow further in geometric proportions with enormous users in the near future and therefore the area of research and development work in this field is highly defensible.

2. MUGs within SNS are also growing in popularity, particularly in South India. But the treatment and design of such facilities within SNS need to be carefully taken up, as unlike general users children within SNS are vulnerable to predators. Hence a strong research footing on the security aspects is needed.

3. While security plays a vital role in preserving personal information of children of MUGs of SNSs, the usability of these sites should not suffer, as children unlike their adult counterparts of SNS, desire more conducive friendly atmosphere.

With the above views in mind, the crux of the problem for the research is pronounced.

1.2 IDENTIFICATION OF RESEARCH PROBLEM

1.2.1 Technical Problems with Security Issues

Security authentication techniques are needed to be classified according to their specific performances for the purpose of meaningful comparisons [Anand Sharma & Vibha Ojha – 2010]. It is therefore essential to study the merits, demerits and issues of different attacking (by intruders) techniques [Manabo Hirano and Tomohiro Umeda, 2012]. Encrypted passwords in the form of texts are easily broken by Brute Force Attack. But of course ‘Brute Force’ method is more time consuming as searching a hash has to be from all possibilities. Compared with Brute Force method, Dictionary attack is relatively faster [Fujita, K & Hirakawa, Y – 2008, Arvind Narayanan & Vitaly Shmatikov, 2005]. Some techniques suite well to stand alone systems, while others are meant for online systems. However, different techniques could be integrated or merged with each other to form hybrids, so that the resultants could be more secured [Mudassar Raza et. al. 2012]. Password based key exchange protocols have been tried out based on Diffie-Hellman algorithms by many published works. These algorithms were enhanced / modified by many authors [Hwang R, J et. al. 2003], so as to deal with flaws and for specific applications.
1.2.2 Social Problems with Usability Issues

Because of too much information, a child generally reveals, it could lead to serious problems [Danah Boyd et. al. 2011]. As children try to share messages, documents etc., Diffie-Hellman algorithm’s enhancement to overcome security flaws still might suffer that an intruder could share some session keys with others by getting an old message passed on by a legitimate innocent child [Chou-Chan Yang, et. al. 2003, Hwang R. J et. al. 2003]. 76% of people believe that their personal data and privacy is already lost through their SNSs. 96% users wouldn’t like the secondary usage of their personal data delivered by the service provider, who has retained and maintaining them [Helen Giggins and Ljiljana Brankovic 2008]. Due to social nature of usability, ‘usability’ apart from ‘security’ plays an important role in restricted forums of SNS [Doug Fox and Shiva Naidu, 2009].

From the above analyses and appraisal from the literature studied, the research problem on ‘Security akin to Usability in Minor User Groups of Social Network Sites’ has been formulated.

1.3 BACKGROUND AND SCOPE OF RESEARCH

The research work is based on the following conditions in its backdrop environment.

1. In recent years, there are threats to limited user groups (includes minor groups) within the SNS community (Helen Giggins and Ljiljana Brankovic, 2008). Traditional attacks still work. Most attackers filch the secrets of users, particularly minor users.

2. It is important to find the right balance between ‘Security’ and ‘Usability’ especially in (limited user groups of) SNS (Weimin Luo, Jingho Liu, Jing Liu and Chengyu Fan, 2009).

3. Assessing ‘usability’ factors for SNSs of limited users is very vital (Doug Fox & Shiva Naidu, 2009).
4. It is therefore essential to determine tight security measures for minor users of SNS, without foregoing usability, as children users may be concerned with usability.

With the above background setting the research work is delimited with the following scopes. The research work focuses its scope with:

1. Social Network Sites having limited minor (children) user groups within them.
2. Security authentication mechanisms containing software as well as hardware oriented techniques.
3. Studies are delimited to social as well as technical.
4. Social studies are limited to South Indian Children users of SNS.
5. Studies on efficiency and optimum performance of security are beyond the scope of research. Scope will be delimited to effectiveness of security akin to usability.

1.4 MAJOR RESEARCH QUESTIONS

- What types of software based authentication techniques would work well with Minor User Groups of SNS?
- What types of hardware based authentication techniques are acceptable to South Indian Minor Users of SNS?
- What types of technical enhancements through algorithms could be arrived at, so as to make the authentication technique suite well effectively?
- How far MUG authentications of SNS are suitable to Children users for effective use akin to security?
- What conclusions could be derived from these observations?
1.5  RESEARCH OBJECTIVES

1. To evolve effective categorization of authentication techniques which are suitable for Minor User Groups of SNS.
2. To try out personalized social authentication techniques for minor user groups of SNS.
3. To evolve and establish a highly reliable authentication framework akin to usability, through algorithms for minor user groups of SNS based on the analytical studies performed in 1 and 2.
4. To propose the evolved reliable authentication frame for minor user groups of SNS, through experiment and social validations.
5. To arrive at conclusions and derive recommendations from the research studies.

1.6  THESIS ORGANIZATION

The thesis is divided into six chapters as detailed below:

- This first chapter dealt with an overall introduction pertaining to the broad research areas along with the scope, research objectives and research questions.
- The second chapter deals with a thorough literature survey presented on the findings of related areas of the research.
- The third chapter presents the research methodology, sampling techniques and the experimental setup adopted for the research.
- The fourth chapter presents different software and hardware authentication techniques that would suite well for the MUG system. The experimental technique applied to determine the intended purpose is elaborated.
- The fifth chapter elaborates the details of the intended authentication framework proposed by the researcher. Social validation of the proposed framework is also presented in this chapter.
The last chapter (VI chapter) presents the outcome of the entire research through conclusions, findings and recommendations, which includes suggestions for future research.

The study and analysis on the findings reported by many researchers are elaborated in the next chapter, which has led to the emergence of the title of the research.