

The Activity Analysis of Online Social Network for Enhancing User Trust

Pawade Abhijeet, Pawade Amit, N Warad, S Kamreddi

Abstract— Online social networking is one of the largest Internet activities, with almost one third of all daily Internet users visiting these websites. We have created a modern experimental educational online social network for the purpose of the study of network structures and communication phenomena in these websites. Characteristics of this environment are issues relating to trust, user privacy and anonymity. Service providers are focused primarily on acquiring users and little attention is given to the effective management of these users within the social networking environment. In order to examine this problem, user trust and its enhancement is discussed. Patterns of activity usage such as friends, private messages, forum, blog, photogallery, comment wall are also discussed in this paper.

Index Terms—Activity Analysis, Enhancing User Trust, Identity Management, Trust and Uncertainty, Evaluating Current Controls

1 INTRODUCTION

Online social networks are currently one of the most popular Internet activities, recently even eclipsing email usage. More than two-thirds of the global on-line population visit and participate in social networks, confirming its worldwide popularity. Researchers have started to analyze activity patterns of users in these websites, focusing usually on friendship and/or private messaging activities.

Here, considered are some of the most common/standard users' activities on online social networking websites. These include:

- friendships,
- private messages,
- forum messages,
- blog messages/comments,
- picture postings/comments, and
- "comment wall" comments.

The rest of the paper is structured as follows. Section 2 analyzes individually each of the above mentioned users' activities. In section 3 some factors such as trust and uncertainty are mentioned. In section 4 and 5 some effective controls and identity management for enhancing user trust are mentioned. And section 6 concludes the paper.

2 GENERAL ACTIVITIES

Here are some activities which are useful to increase user trust as mentioned above. Comparison between these all activities are shown in table below in the form of percentage and ranges.

- Pawade Abhijeet, Pawade Amit are currently working as engineering faculty in Solapur University.
email: abhijeet.s.pawade@gmail.com, tpocevvpviet@gmail.com
- N Warad and S Kamreddi are currently pursuing bachelor degree program in computer science & engineering in Solapur University.

Some activities are mentioned below

2.1 Friendship Activity

209 users had 1162 online friendship connections. On average, a user had 5.56 friends. User with most friends had 71 outgoing friendship links. 61.2% of users had one or more online friends.

2.2 Messaging Activity

Population of 209 users sent 705 messages. On average, a user sent 3.37 messages to other users. User with the most messages sent 63 messages. 52.2% of users were sending messages.

2.3 Forum Messages

Forum was a very popular place for users' activities on Fitcolab network. On average users posted 11.9 forum messages. 56% of users were active on the Forum. They totaled 2457 regular (public) and 40 anonymous forum postings. The most active forum user had 281 forum posts. Interesting to note is that forum activity is distributed "unpredictably" uniform for users between 7 and 42 forum postings.

2.4 Blog Messages/Comments

You need to Only 35 or 16.7% users participated in blog activities, meaning posting a new blog article or a comment to an existing blog. There were only 77 blog activities (new blogs or blog comments). Most active blog users made 8 blog activities.

31.1% of users participated in activities related to photogallery. These activities consisted of posting pictures or comments to pictures. Altogether there were 267 such activities. The most active photogallery user had 26 photo activities.

2.6 "Comment Wall" Comments

There were 31.1% of users that participated in Comment Wall (CW) activity. Posted were 207 CW comments. The most active CW user had 16 CW comments.

TABLE I Activity of Regular User

REGULAR	ACTIVE USERS	TOTAL	RANGE ACTIVITIES	AVERAGE	AVG. ACTIVE
FRIEND	70.77%	711	0...70	9.75	13.90
PRIVATE MESSAGE	48.50%	159	0...20	2.15	4.42
FORUM	53.40%	1250	0..270	17.03	30.55
BLOG	27.05%	49	0..9	0.60	2.28
PICTURE POSTING	48.55%	170	0...25	2.45	5.00
COMMENT	44.6%	130	0..15	1.75	3.88

TABLE II Activity of Learning User

LEARNING USER	ACTIVE USERS	TOTAL	RANGE ACTIVITIES	AVERAGE	AVG ACTIVE
FRIEND	56.0 3%	440	0...343	3.70	5.70
PRIVATE MESSAGE	55.0 1%	546 0	0...60	4.05	7.50
FORUM	56.3 0%	125 0	0..970	9.16	15.90
BLOG	10.4 5%	30	0..75	0.25	2.70
PICTURE POSTING	22.5 0%	95	0...10	0.70	3.75

3 INCREASING USER TRUST: THE CHALLENGE

We have just studied different activity analysis of standard Online Social Networking Functionalities. So now let us consider the trust factor. Trust forms one of the most highly regarded human values and contributes to the basic pre-conditions when users adopt electronic based interactions. The principles of trust evident in user relationships within online social must be explored to understand and define the expectations and requirements of online users within this online environment.

3.1 Trust and Online Social Networking

Trust can be defined as the willingness of an individual to be vulnerable to the actions of another individual, based on the expectation that the other will perform a particular action. This acceptance of vulnerability and risk is irrespective of the ability to monitor or control the behaviour exhibited by the other party involved. Another view defines trust as a mental phenomenon that occurs within social contexts and applies to both online and offline environments. Evidence does not depend on one interaction but it depends on previous experiences that add to the social context that trust develops gradually through interactions.

Trust and levels of trustworthiness within these websites can only be based on the information available to users. It is true that information influences people's judgements about others. After users establish a membership and experience the social networking site as valuable, their usage to the site will increase. Each user will then have to decide if the posted in-

formation experienced on the social network is an honest reflection of reality.

3.2 Trust and Uncertainty Reduction Theory

When undertaking an online social networking experience, individuals are faced with varying levels of uncertainty regarding the encounter. This is same like introductory phase with unknown individuals. The unpredictable nature of these interactions adds to the feeling of uncertainty. Trust and trustworthiness becomes a result of an individual's ability to reduce uncertainty by increasing an individual's behavioural predictability. Uncertainty Reduction Theory is the discipline that defines the influence of uncertainty during a relationship, as well as a means of reducing this uncertainty and increasing the predictability of interacting individuals. This is achieved by engaging in various steps and checkpoints to decide whether the individual is liked or disliked.

Interactions between unknown individuals typically follow three stages. Interaction may also terminate at the end of the entry phase, as continuing through the three stages is at the discretion of both individuals.

The three stages are:

1-Entry Stage: In Entry Stage, information of a demographic nature is generally discussed. This includes name, gender and age, economic and social status. Interactions within this entry stage are controlled by societal communication rules and norms.

2-Personal Stage: When users begin to share information regarding attitudes, values and more personal data such as likes and dislikes, they enter into the Personal Stage. During this stage, individuals feel less inhibited by rules and norms and have a tendency to communicate more freely with each other.

3-Exit Stage: Next is the Exit Stage. During this stage, individuals decide on future interaction plans. They may also discuss ways to allow the relationship to grow and continue.

3.3 Trust and Controls

Trust and levels of trustworthiness within these websites can only be based on the information available to users.

It is evident that trust and levels of trustworthiness are characterized by relationships between individuals. However, trust must also be placed in the system. Uncertainty is present in both elements of the encounter, so a way of reducing this uncertainty and increasing user confidence is needed. The level of trust and the presence and adequacy of controls are the two main factors affecting user confidence. The higher the degree of trust displayed between individuals, the less need to implement stringent controls. This can be reversed if a low degree of trust is evident, where more controls are then needed to establish confidence.

In order to reduce uncertainty and increase trust, the introduction of an effective system of controls can overcome this challenge. Systems of controls become applicable in an OSN environment for several reasons. As controls are a planned measure designed to mitigate a risk, their primary aim is to protect users and their information from individuals desiring to harm them. These controls are often combinations

of people, processes and tools put in place to prevent, detect or correct issues caused by unwanted events. Their desired outcome is to create a carefully designed control framework that weaves the various types of controls together and protects the organization from risks. The controls are classified on the basis of their functionality, they are

1-Preventative: This category of control is aimed at avoiding any unwanted situation.

2-Detective: This category of control is aimed at countering the error factor.

3-Corrective: This category of control is aimed at restoring the system to its accepted state.

4 IDENTITY MANAGEMENT WITHIN ONLINE SOCIAL NETWORKS

IDM is defined as the management of identification, authentication and authorization information, as well as the use of this information to authenticate and properly authorize principals in a computer network or distributed system, such as the Internet.

The common attribute of IDM practices within the current online environment is the “one to many” relationship between user and service provider. These IDM practices aim to manage one user across many service providers. However, the more challenging aspect of IDM is the implementation of the process within these service providers. Users are able to create multiple user profiles or accounts that can be accessed within one online service. Systems and processes need to be implemented that can manage these users and achieve a satisfactory level of user-to-profile linking. Current IDM practices will now be briefly discussed. These practices include the core concepts of Single Sign-On (SSO) and Identity Management Systems (IMS).

4.1 Single Sign-on

Single sign-on is the ability of a user to create a single set of login details, which they can share and gain access to numerous systems or networks. Efficiency gains are experienced, with users no longer re-prompted for login details across applications and services. This is only possible if the service provider is partnered to the SSO provider.

4.2 Identity Management Systems (IMS)

An IMS refers to an information system or to a set of technologies that can be used to support the management of identities.

5 EVALUATING CURRENT CONTROLS

To test the various controls and processes presented by the OSN service providers to their users, a detailed experiment was designed and conducted for analysis. Each area was identified due to the contribution to the problem area, and was assessed for possible vulnerabilities.

5.1 Profile Creation And Interactions

The main feature behind the design of the experiment was creating a number of fictitious user profiles, each with a specific character focus and created by the researcher. These profiles were used to conduct the daily activities of the average social networking user. Each profile had an associated character type linked to it, and this was the style and attitude of interaction used during the experiment.

5.2 Key Assessment Areas

All areas are closely linked to user trust of the system and fellow users, as well as any IDM practices currently being employed in an OSN environment. These assessment areas were used to guide the experiment as well as form the primary focus areas of the proposed artefact.

5.3 Experiment Findings

The key findings from the experiment displayed evidence of shortcomings in several areas of assessment. These findings are as follows, presented per assessment area:

- 1-Age Controls
- 2-Privacy Controls
- 3-Profile Controls
- 4-Identity Management – Service Provider
- 5-Administrator Effectiveness

TABLE III SUMMARY OF EXPERIMENT ASSESMENT AREAS

Assessment Area	Assessment Items
Age Controls	Age Verification during profile creation Ability to search users by age Ability to send underage users friend requests Ability for underage users to interact with adults Search groups where teen activity would be high
Privacy Controls	Default setting when creating a profile Ease of use – changing of privacy settings Public versus Private profile settings
Profile Controls	Management of friends Blocking/Reporting of unwanted users
Identity Management – Service Provider	Multiple profiles created by single user Multiple profiles share same password Identity Management All created profiles linked to a blocked user
Administrator Effectiveness	Treatment of reported/blocked users Feedback from reporting/blocking requests

6 CONCLUSION

In conclusion, it is evident that online social networking has several areas where controls and effective IDM processes are needed. Patterns of user activities were studied which are useful for enhancing user trust. Data from an experimental network was analyzed, by exploring individual usage patterns of each of the standard social networking functionalities. It was found that the most users were interested in friendship activity. And the least active feature was blog. The more interest was found for private communication.

The experiment was taken place to assess the current controls and identity management processes evident within the current social networking environment. Based on the experiment findings, a proposed set of controls was presented which aimed to provide an effective means to enhance user trust through their implementation and management. User trust and confidence are the basic requirements of both system and user and the implementation of an effective set of controls can assist in achieving them.

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