A Study on Smartphone User behaviour and Security Awareness

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Abstract:
        Computational systems, interestingly, often have little or no understanding of the many roles a person might play, of the behavioral expectations associated with these roles, or the specific role a person is enacting when interacting with a system. Even social devices and services like smart phones and social networking services operate with a tremendously limited understanding of social role. The main objective of this paper is to analyzes the people's perception and behavior among smart phone users and about the security risk with their Smartphone's with special reference to Tiruchirappalli, Tamil Nadu, India. .Questionnaire is employed for the purpose of study. The probability sampling was used for data collection. This paper deals with the Smartphone user behavior and their knowledge on security systems of the phone. The capacity of a Smartphone to access, manipulate, produce, store or share content almost as soon as it is created and wherever it is created, provides the rationale for why education needs to explore the technology. The versatility promises to change the nature of educational content and communication and therefore the nature of learning itself. In this study SPSS and Excel has been used to analysis data. This paper concludes with the set of guidelines for smart phone users to recognize the threats and methods to devoid the same.

Keywords: Smartphone User Behavior, Security Awareness, Smart Phone Security, Mobile analytics and Mobile Internet

Introduction

        Smart phones are increasingly powerful personal devices that offer novel ways of communication, information search, sharing and entertainment. Most popular Smartphone operating systems worldwide are Google's Android that comes with a variety of Smartphone's and Apple ios that is used in i phone. Smartphone's put powerful, user owned computing devices into the pockets of students.

Smart phones, coupled with rich applications and mobile data services, allow us to connect with our family, friends and community from the moment we wake up until the end of the day. The devices become highly customized personalized platforms for communication, organization, information production and content management.

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A SENSE OF BEING CONNECTED is the strongest sentiment and it spans across demographics and brands, services and application used. The services that drive the highest levels of connectedness are texting, messaging and talking on the phone or direct messaging via social networking sites. Whilst smart phones are only pocket size, they incorporate computing power and memory capable of running complex software and storing huge amounts of data. Functionality including full 'qwerty' keyboards, cameras, audio recorders, gesture-based input and high-resolution displays, is complemented by a wide range of apps, which include support for office productivity, location-based interactivity, media production, web browsing, social media, communication and entertainment.

Smart phones can conveniently and directly connect to the internet through protocols including Wi-Fi, 3G and indirectly through Bluetooth. This connectivity allows data to be accessed from anywhere in a timely way, while allowing it also allows the user to distribute content in various media to others.

Data Mining

Data mining refers to extracting or "mining" knowledge from large amounts of data. Data mining is the process that attempts to discover patterns in large data sets. The overall goal of the data mining process is to extract information from a data set and transform it into an understandable structure for further use. Data mining is a powerful new technology with great potential to help companies focus on the most important information in the data they have collected about the behavior of their customers and potential customers. In this project, we have used data mining techniques to classify and cluster the data.

Review of Literature

Gwangjae Jung, Singapore Management University, Singapore (2013), has presented a article titled "The emergence of smart phones has brought a technology disruption to the telecom business". This research was related to telecom services overall and has the goal of finding the impact of Smartphone adoption to consumer's switching behavior in broadband and cable TV services. This research adopts a quasi experimental design and investigates the casual effect of Smartphone service adoption on broad band and cable TV choices.

Aditya Mahajan (April 2013), in his article named as "Forensic Analysis of Instant Messenger Applications on Android Devices". It is suggested that the modern day Smartphone's have built in apps like WhatsApp & Viber, which allow users to exchange instant messages, share videos, audio's and images via Smartphone's instead of relying on their desktop Computers or laptop thereby increasing the portability and convenience for a layman smart phone user. An Instant Messenger (IM) can serve as a very useful yet very dangerous platform for the victim and the suspect to communicate.

Anindya Ghose, Sang Pill Han (2011). He has discussed on "An Empirical Analysis of User Content Generation and Usage Behavior on the Mobile Internet". The key objective was to analyze whether there is a positive or negative interdependence between the two activities.
He used a unique panel data set that consists of individual-level mobile Internet usage data that encompass individual multimedia content generation and usage behavior.

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He combined this knowledge with data on user calling patterns, such as duration, frequency, and locations from where calls are placed, to construct their social network and to compute their geographical mobility.

Babu Santhalingam, K. Revathi, J. Devi (2011), have published a paper titled as ," Mobile Phone Usage Survey among Students and Staffs of Universities Using Data Mining Technique". This Study explored the extent of various mobile phone model and service providers usage among Students and staffs of various colleges and Universities in Kanchipuram. The analysis had been carried out by using a survey dataset and using the J48 decision tree algorithm implemented in Weka. In Addition the study determined Gender differences in Mobile Phone usage and duration details, Purpose of Mobile Phone usage, problems dealing with Mobile Phone, Satisfaction of the service provider, Type of service in terms of prepaid and post paid and General opinion of the respondents about Member of parliament.

Mengwei BIAN, (2011), he has published a article on "Smartphone Addiction: Linking Loneliness, Shyness, Symptoms and Patterns of Use to Social Capital". The purpose of this study was to explore the roles of psychological attributes such as shyness and loneliness and Smartphone usage in predicting Smartphone addiction symptoms and social capital.

Hee Seo Lee, Taek Gyeom Kim and JiYoun Choi (2012) in their article discussed on "A Study on the Factors Affecting Smart Phone Application Acceptance". The result showed that personalization has a positive effect on performance expectancy, and that performance expectancy and effort expectancy have positive effect on usage intention, use behavior, and recommendation intention.

Research Methodology

Overall Objective

To analyze the smart phone users behavior and their level of security awareness.

Specific Objectives

To study about the interaction and habits-activity preferences of Smartphone users
To identify website access preferences and time spent on web through Smart phones.
To study about the problems and Smartphone website problems and frustrations in general usage of smart phones
To study about the Smartphone user's security awareness.

Source of Data

Questionnaire is employed for the purpose of study. The questionnaire consists of six parts. Namely demographics information, Interaction preferences, User Habits-Activity preferences, Website access preferences, Problems in general usage and frustrations, News in smart phones and Security awareness

Size of Sample and Population

A quantitative approach is employed for the purpose of study. Probability sampling is used for selecting the respondents. Total sample size is 100. Samples are taken from various age groups of 18-47.

TOOLS USED: SPSS and MICROSOFT EXCEL 2010

Categorical Regressions Test

The categorical regression is to test whether there is any relationship between the dependent variable (Age group of respondent) and Independent variables (Playing Games, Watching Videos, Reading news, Posting to Blogs, Shopping, Check E-mail .

Dependent Variable: Age group of respondent

Independent Variable: Play Games, Watch Videos**,** Read (or) Post to Blogs, Purchase Products and Services**,** Research Travel Destinations, Check E-mail

Table 1.0 Model Summary – Relationship of Variables

Multiple R	R Square	Adjusted R Square	Apparent Prediction Error
.544	.295	.204	.705

Dependent Variable: Age Group

Predictors: Play Games Watch Videos Read (or) Post to Blogs Purchase Products and Services Research Travel Destinations Check E-mail

Table 1.1 ANOVA – Relationship of Variables

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	25.995	10	2.600	3.228	.002
Residual	62.005	77	.805		
Total	88.000	87			

Dependent Variable: Age Group

Predictors: Play Games Watch Videos Read (or) Post to Blogs Purchase Products and Services Research Travel Destinations Check E-mail.

Table 1.2 Co-efficients – Relationships of Variables

	Standardized Coefficients		df	F	Sig.
	Beta	Bootstrap (1000) Estimate of Std. Error			
Play Games	.218	.114	3	3.659	.016
Watch Videos	.091	.178	1	.265	.608
Read (or) Post to Blogs	.377	.136	3	7.693	.000
Purchase Products and Services	-.151	.193	1	.613	.436
Research Travel Destinations	-.318	.129	1	6.124	.016
Check E-mail	-.188	.125	1	2.280	.135

Dependent Variable: Age Group

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Table 1.3 Correlations and Tolerance

	Correlations			Importance	Tolerance After Transformation	Tolerance Before Transformation
	Zero-Order	Partial	Part			
Play Games	.254	.236	.204	.187	.876	.798
Watch Videos	.173	.100	.084	.054	.844	.710
Read (or) Post to Blogs	.279	.378	.343	.356	.830	.850
Purchase Products and Services	-.090	-.170	-.145	.046	.927	.892
Research Travel Destinations	-.197	-.334	-.297	.213	.870	.861
Check E-mail	-.227	-.217	-.187	.144	.985	.959

Dependent Variable: Age Group

Figure 1.0 Purchase Products and Services

Optimal Scaling Level: Spline Ordinal (degree 2, interior knots 1).

Beta: -.151.
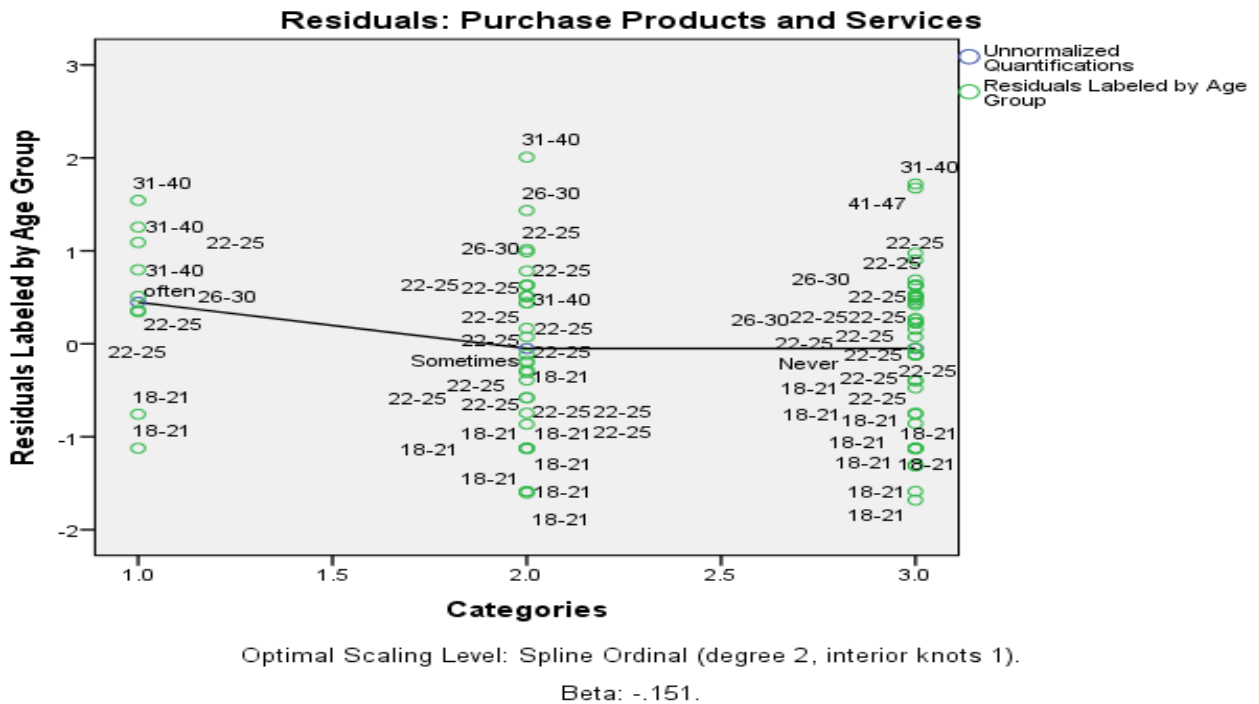
Inference

The R value is .544 which is lesser than 1, but a positive value. The R2 means there is 30% of variance in the dependent variable. Since the annova table has significance level [0.002<0.05] it is significant, with f value of 3.228 and dof 10.There are positive standard regression co-efficient for the predictors, Play Games[0.218], Watch Videos[0.091] , Read (or) Post to Blogs[0.377].

There are also negative standard regression coefficients for the predictors, Purchase Products and Services [-0.151], Research Travel Destinations [-0.318], Check E-mail [-0.188]. So, there is no relation between the age group of Smartphone user and Purchase products and services, Research travel destinations, Check email. And there is a strong relation between the age group of Smartphone user and Play games ,Watch videos and Read(or) Post to blogs because the significance level is[0.002]which is less than [0.05].Thus age group determines to play games, watch videos and Read or post to blogs via Smartphone.

Major Findings

Smartphone users are more in age group of 22-25(40.9%) followed by age groups of 18-21 (23.9%) & 26-30(11.4%).

Android OS (70.5%) Dominates the Smartphone followed by Ios (12.5%) Smartphone users are mostly belongs to Income level of 10,000-30000/month followed by below 10,000/month.

Smart phones users are mostly, those who completed post graduate/PhD (47.7%) followed by under graduates (35.2%) & High school graduates (14.8%).It was found that all the age groups from 18-21 to 41-47 are aware of the Screen lock that prevent phone being used until the code is entered, they tends to have in their phone as primary security.

It implies that all the groups need more awareness like checking security status in their phone while using app, which may contain "spyware" that allows criminals to access the private information.

It was found that implies that all the age groups does not have enough knowledge about the malware in their phone. Users in the age group of 18-21 and 22-25 need more awareness regarding the apps can transmit confidential payment information without user's knowledge compared to age group of 26-30 and 31-40.

Negative correlation, implies that Current employment status does not decides the respondent using mobile apps for browsing the web. Positive correlation implies that, the Positive correlation, implies that age group of respondent determines how aware of log off properly while using Social network APP. Positive correlation, implies that Current employment status of respondent also mainly determines to Log off the social networking app. Level of education of the users determining their preference to use their Smartphone for searching travel distinction.

Suggestions

The Smartphone users are increasing more probably between the age groups 18-21 and 22-25, Android OS dominates more Smartphone than ios. It also to be noted that males are more stay connected to Smartphone while waking up and use as an alarm clock and waking up immediately by reaching the Smartphone than females. It is also important for the users to safeguard from the potential security risks and learn precautions that help to protect themselves and their information.

It says all the age groups from 18-21 to 41-47 are aware of the Screen lock that prevent phone being used until the code is entered. Before knowing location data attached onto image file will result in tracking of Smartphone more awareness needed for the age group of 18-21, 22-25 and 26-30, needed more awareness like checking security status in their phone while using app, which may contain "spyware" that allows criminals to access the private information and also needed more awareness needed for all the age group about the malware in their phone, which makes the phone to destruct. Simultaneously while handling the Smartphone all the security measures to be check out often to have the phone for long life.

And age group 18-21 and 22-25 need more awareness regarding the apps can transmit confidential payment information without user's knowledge compared to age group of 26-30 and 31-40.And age group 41-47 are not aware of checking the mail through Smartphone so awareness needed for the group. Both in Post graduate/Ph.D and under graduates many are browsing the web between 1-2 hrs through mobile apps so smart phone is primarily used only for 2 hrs even to an maximum extent.

Age group and current employment status of respondents determines to type address into browser than going into links, how to access the web by typing address into browser, so more awareness needed at the primary stage of dealing with the browser. It also of implies that age group 18-30 use smart phone mainly for playing games and so many games applications can be installed. Males decide to read articles on individual news sites than females. Age group also determines a strong relation with playing games, watching videos and read or post to blogs so targeting all the age groups these tends to be make aware. There is also a strong relation with highest level of education the Smartphone user has receive news alerts on phone, read articles on individual websites, so awareness messages (with links) to be sent to the user and motivate to participate in receiving news alerts and read article on individual websites.

Conclusions

All age groups use smart phone. It paves way to synchronize oneself to the pace of the tech world. The current research concludes that many of the Smartphone users are not aware of security and privacy risks. They have their location data embedded into image files, many don't set Bluetooth to "non discoverable mode", don't know about the malware which can attack phone, don't have knowledge about local Wi-Fi(hotspot) that is insecure may result in tracking of phone. In addition, few Smartphone users have encountered hacking of their phone. Antivirus software helps in protecting the user while browsing. But it is not good to blame third party application, so the best way to protect oneself is by following the above precautionary methods to have a safe and enjoyable Smartphone accessing experience

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