

Discovering the most disconcerting Challenge Faced by Mobile Device Users

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Abstract

Mobile computing is generally considered to be a computing aspect which involves mobile communication, mobile hardware and mobile software. Users are allowed to transport the devices from one location to another while transmitting data and information. It offers the opportunity to bring people together and give everyone access to a greater wealth of information and knowledge and to share their knowledge with others. Since the idea of mobile computing comes in to been sometime around 1990s, people begins to use different type of these devices in order to ease their life. Difference scholars in there publications highlighted several challenges facing mobile computing device users. This study aimed at finding out the most disturbing challenge faced by mobile device users among the listed challenges such as Address Migration, Disconnection, Low Bandwidth, and Bandwidth Variability, Location, Low power, Potential Health Hazard, poor security and Small User Interface via a large-scale study of 400 participants from Federal University Dutse Jigawa State Nigeria. The primary data was collected using predesigned interview schedule, hence the convenient simple random sampling technique was adopted. Simple Microsoft chart template was used to Analyzed the collected data. The results of the findings shows that Most of the participants (31%) considered low power to be the most disturbing challenge facing mobile device users.

Keyword: Mobile computing, mobile devices, wireless communication and Challenges.

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INTRODUCTION

What really influenced the leader of the research group to conduct this research is the conversation or argument heard by the leader between some groups of student while waiting for the lecture room key in order to attend the class. The argument was on the most disturbing challenge in using the mobile device, mobile phone to be specific.

Mobile computing is a new computing model compared to static computing, in which, mobile devices are used to send and receive information from anywhere, at any time, using wireless technology or network. Wireless network significantly improves the effectiveness of a portable computing device. The term mobile refers to ability to move from one location to another which implies that the medium needs to cope with moving users.

Different writers defined the term mobile computing in different books, article and journal which in the end turns to mean the same. Mobile computing is a new computing paradigm in which mobile devices are used to access information from anywhere, at any time. (Rahul & Amol, 2013) also (Masuod, Ronak & Hojat, 2012) define mobile computing as an interaction between human and computer by which a computer is expected to be motivating during normal usage. Mobile computing is a computing system in which a computer and all necessary accessories like files and software are taken out to the field, written by (Bezboruah & Abdussalam, 2010). These definitions highlights the main features of mobile computing which differentiate it from static computing.

The Aspect of mobile computing is a fusion of portable computing device / hardware, software / operating system and wireless communication with the aim of providing seamless computing environment for mobile users. Mobility caused loss of connectivity. Unlike typical wired network, number of mobile users varies dynamically and large convention and public events may overload the network capacity. Mobile devices are characterized by smaller size, light in weight, small user interface and low power. Wireless communication faces more impediments than wired communication due to environmental factors such as interferences. As a result wireless communication is characterized by lower bandwidth, higher error rates and frequent disconnections.

BACKGROUND OF THE RESEARCH

Different types of mobile computing devices have been introduced with different functionalities (Vangie, 2015), some of which include (i) Personal digital assistance (PDA), usually called personal data assistance or palmtop computer (Benj, 2018) is a type of mobile device that served as personal information manager. The first "PDA" was released in 1984 by Psion followed by organizer II then Psion's series 3 which is more similar to the known PDA technicalities. The term PDA was first used officially on January 7, 1992 by Apple Computer CEO John Scully at Consumer Electronics (McCraken, 2012). The normal PDAs has all the requirements of connecting to Internet which include electronic visual display, which allow the use of different web browser, audio capabilities, makes the device to be used as a portable media player (Masuod, Ronak & Hojat, 2012). "PDAs are generally considered obsolete with the widespread adoption of smart phone" (Chanda, Rakesh & Sushma, 2014). (ii) Enterprise digital Assistance (EDA), An EDA is a handheld device which was design to be use within a small and medium enterprise (SME) and enterprise business application (EBA) as a data captured mobile device." It helps employees get things done in smarter, more efficient ways, and drive collaboration" (Bynghall, 2019). (iii) Tablet

Computers are type of mobile devices incorporated into a flat touch screen and mainly operated by touching the screen . The device uses an onscreen virtual keyboard that is to say no physical keyboard is attached to them as such , digital pen , passive stylus pen and human fingers are used (Pcmag, 2017; McCracken, 2012 ; Markoff,1999). Apple released the iPad with operating system and touchscreen technology in 2010 and became the first successful mobile computer tablet to achieve worldwide commercial purposes (Gonsalves, 2010) . (iv)Wearable computers is popularly known as body-born computer are tiny electronic mobile device that are worn by the users on top or under their clothes (Edward, 1998). (v) Smartphone is mobile hand held device designed on a mobile operating system(Burke,2019), with high advanced computing capability and connectivity compared to other feature phone (Sager,2012; Nusca,2009 ;Krolopp,2005). A category of mobile phone that provides the functions of a small computer (Phonescoop,2019). Some functionalities were added in later models such as portable media players, low-end compact digital cameras, pocket video cameras, and GPS navigation units to form one multi-use device, high-resolution touchscreens and web browsers for displaying standard web sites and mobile-optimized pages. Also, Wi-Fi provided high-speed data access and mobile broadband. Most of the feature phones are able to run applications based on platforms such as Java Micro Edition (JME) (Bezboruah & Abdussalam, 2010). Modern smartphone uses most of mobile operating system (mobile OS) such as Google's Android, Apple's iOS, Nokia's Symbian, RIM's BlackBerry OS, Samsung's Bada, and Microsoft's Windows Phone. (vi) The Carputer is the predominant term used to describe a category of mobile computer designed and modified to specifically install and run in automobiles. Originally these were based on industrial PC technology. But as smartphones and PDAs have become more powerful, and have included useful technologies like GPS and Bluetooth, they become the predominant base platform for developing carputers (Thomas, 2017). The recent popularity of carputers has caused the creation of more advanced units that use touch screen interfaces, integrate with vehicles via On Board Diagnostics (OBD-II) link, and offer a variety of other add-ons like rear-view cameras and GPS navigation ,OnStar mobile TV, Vehicles tracking system, event data recorder and broadcast wireless Access(BWA).

Challenges in Mobile Computing

Integrating sensors into mobile phones have several practical advantages. Several articles have identified the fundamental challenges in mobile computing, such as poor resource, less secure, poor connectivity, potential health hazard and less energy since they are powered by battery compared to the wired infrastructure. (Nusca,2009) Categorized Mobile Computing Challenges in to three major areas as; wireless communication, mobility, and portability.

Wireless Communication

Generally wireless computers have less resources compare to stationary (wired) computers, this is because wireless computers are smaller in size, lighter and consume less power than stationary computers. Wireless communication is more difficult to implement than wired communication because of the interaction of the surrounding environment with the message signal. Problems caused by the environment include blocked signal paths, echoes and noise. Hence wireless connections are more error prone, have much lower bandwidths, and have frequent spurious disconnections when compared to wired connections.(Rahul & Amol,2013) .These factors can increase communication latencies due to error control checks, retransmissions, time-out delays and brief disconnections. Under this category, we are to observe the following.

(i) Disconnection

It is obvious that wireless communication is so vulnerable to disconnection than wired communication, it is of great concern when designing successful mobile computers. Resources can be allocated to handle disconnections more elegantly, or to try and prevent those disconnections from happening.

(ii) Poor Security.

The security of wireless communication can be compromised much more easily than that of wired communication. Precisely if the transmission is over a large area network.

(ii) Poor Bandwidth and Bandwidth variability:

Wireless networks provide lower bandwidth than wired networks. The deliverable bandwidth per user depends on the number of users sharing a cell.

Mobility:

The ability to move from one location to another while connected to the network increases the volatility of some information. In stationary computing, data are considered to be static while in mobile computing it is said to be dynamic. A stationary computer can be configured statically to use the nearest server, but a mobile computer needs a mechanism for determining which server be to use. The following challenges are under Mobility.

Address Migration:

As people move, their mobile computers will use different network access points, or addresses. In the Internet Protocol, for example, a host IP name is inextricably bound with its network address, moving to a new location means acquiring a new IP name (Rahul & Amol, 2013). Several techniques may be used to determine the current network address of a mobile unit (Wei, He & Huang, 2002).

Location.

Since traditional computers do not move, information that depends on location such as local server name, available printers, and the time zone, is typically configured statically. One challenge for mobile computing is to factor out this information intelligently and provide mechanisms for obtaining configuration data appropriate to each location.

Portability:

Our ordinary desktop computers are meant to be static, so designers must take note of space, power, cabling and heat dissipation. In contrast, designers of hand-held mobile computers should struggle for the properties of a wrist watch that is to say small, light, durable, operational under wide environmental conditions and requiring minimal power usage for long battery life. Some design pressures caused by the portability constraints are as follows: .

Low power:

Batteries are the heart of any mobile device. Batteries are the largest single source of weight in a portable computer. While reducing battery weight is important, too small battery can undermine the value of portability by causing users to recharge frequently, carry spare batteries, or use their mobile computers less. Minimizing power consumption can improve portability by reducing battery and lengthening the life of a charge.

Small user interface:

The current windowing techniques used for smaller and portable mobile devices are inadequate. It is impractical to have several windows open at the same time on a small screen even at high resolutions.

Potential health hazard

People who use mobile devices while driving are often distracted from driving and are thus assumed more likely to be involved in traffic accidents (Arevalo,2020). It's obvious, there is considerable discussion about whether banning mobile device use while driving reduces accidents or not (Reardon,2010). Questions concerning mobile phone radiation and health have been raised.

METHODOLOGY

In the present study, the researcher has collected and used primary data, Using an interview schedule. The primary data was collected based on the following disturbing challenges of mobile computing devices such as low power, address migration, small user interface, potential health hazard, disconnection, location, poor security, low bandwidth, and bandwidth variability. The above-listed challenges are believed to be disturbing the users of mobile devices on the campus while using the devices. The data was Analyzed using simple Microsoft chart template as shown in fig.1 below.

Sampling Design

Being a federal university, different people from across the nation and the entire world are expected to be there hence the researcher decided to use the University to simplify further research. During the period of this study, federal university Dutse had six faculties, units and the main administrative block called senate building among the existing structures.

To collect the primary data regarding the most disturbing challenge among the listed challenges faced by mobile phone users in Federal University Dutse Jigawa State, Nigeria, the survey was conducted from January, 2019 to August, 2019 with the help of predesigned interview schedule, hence the convenient simple random sampling technique has been adopted for the present study with Federal University Dutse as a universe. Since the total number of staff and students of the University are numerous, the researcher has randomly selected only 400 mobile computing device users (mostly cellular phone) based on the convenience of the researcher. However, the researchers make sure that the respondents represent the whole Units and Faculty of the University.

RESULTS AND DISCUSSION

From the table below, it is clear that out of 400 mobile phone users, 47 (11.75%) believe that Address Migration is the most disturbing challenge facing the mobile phone users. It is evident that in the third row of the table, 50(12.5%) respondents out of 400, disclosed that disconnection is the most disturbing challenge out of all challenges listed above. Meanwhile only 43(10.75%) mobile phone users agreed that Low Bandwidth and Bandwidth Variability is the most disturbing challenge. It is learned that in the fourth row of the table, out of 400 respondents, 32(8%) supported the argument that Location is the most disturbing challenge faced by mobile phone users. considering the fifth row of the table, it is obvious that 124 respondents i.e., about 31% of the sample size agreed that low power is the most disturbing challenge of all the listed down challenges. "Potential Health Hazard" is one of the challenges facing the mobile phone user in the University but only 21(5.25%) respondents believed that it is the most disturbing challenge out of the mentioned challenges. It is also

Discovering the most disconcerting Challenge Faced by Mobile Device Users

clear that in the seventh row of the table above, out of 400 respondents, 24(6%) stated that “poor security” is the most disturbing challenge faced by mobile phone users. it is evident that on the last row of the table above, 59(14.75%) out of 400 respondents agreed that “Small User Interface” is the most disturbing challenge that is facing the mobile phone users.

Fig.1, presented the analysis of the data set, showing that the majority of the respondents are in the opinion that low power is the most disturbing challenge faced by mobile device users.

Table1: Opinion of the respondents towards the most disturbing challenge in Mobile Computing

S/no	Challenges Facing the Mobile Phone Users	Number of Respondent
1	Address Migration	47
2	Disconnection	50
3	Low Bandwidth And Bandwidth Variability	43
4	Location	32
5	Low Power	124
6	Potential Health Hazard	21
7	Poor Security	24
8	Small User Interface	59

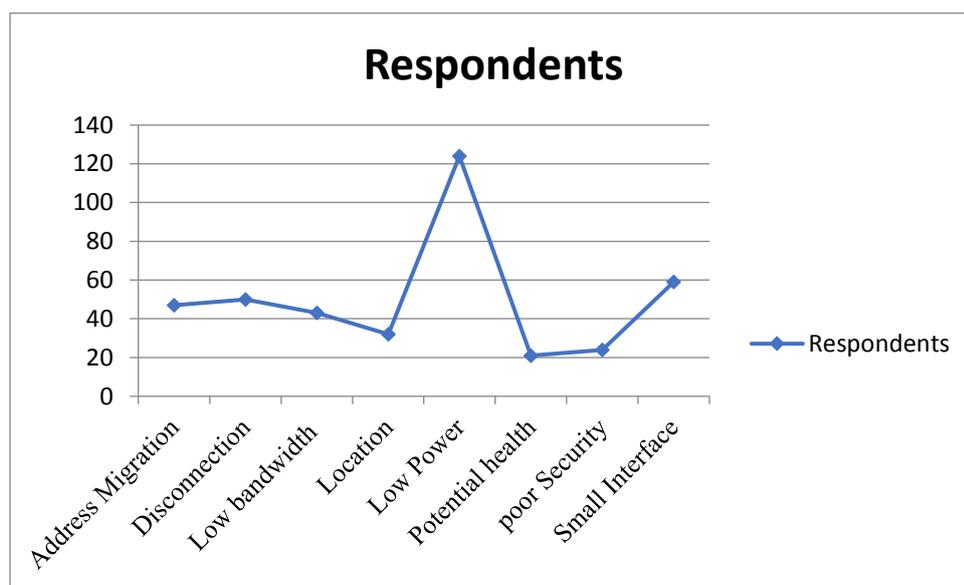


Fig1: Low power the most disturbing challenge

It is obvious that this study is limited to a University in the northern part of Nigeria with only a few participants, we are therefore planning to carry out the predominant research that will cover all parts of the country so that the mobile device companies may use the result to improve customer satisfaction.

CONCLUSION

This paper presented the results of a research study of 400 participants from federal university Dutse, Jigawa State, Nigeria to investigate the most disturbing challenge in using mobile computing devices among the most common challenges such as Address Migration,

Disconnection, Low Bandwidth and Bandwidth Variability, Location, Low power, Potential Health Hazard, poor security and Small User Interface. The result shows that majority of the users pointed out that Low Power is the most disturbing and frustrating challenge in using mobile devices.

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