

SMART PHONE FOR ELDERLY POPULACE

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Abstract

Smart phones possessions used to be considered as a luxury. Over the period of time, it became a necessity rather than luxury. Smart phones are essential for everyone including the elderly population. The device can act as a long-range communicator, multimedia device, infotainment device, etc. However, the current problems with the existing smart phones are that its complex features and interface designs have intimidated some elder users from using the device. The problem can be addressed by identifying the features needed for these special users. The device should have the features like larger intuitive interface, ergonomics, etc. which has been designed to make it user friendly for elder population. The proposal has been made with the view that the elder population of the fore coming future will be tech savvy.

Keywords: SMS: Short Messaging Service, IR: Infrared Radiation, GPS: Global Positioning Service, 2G: second Generation, 3G: Third Generation, 4G: Fourth Generation, WLAN: Wireless Local Area Network, CDMA: Code Division Multiple Access. GSM: Global System for Mobile communication, PDA: Personal Digital Assistant, HAC: Hearing Aid Compatibility, M3: Rating indicates the handset has satisfied the ANSI standard, M4: Rating indicates the handset has exceeded the ANSI standard, SAR: Specific Absorption Rate, RF: Radio Frequency,

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1. INTRODUCTION

A smart phone is a phone created on a mobile operating system, with superior computing potential and connectivity than a feature phone. Initial smart phones amalgamated the functions of a PDA with a mobile phone. Later models added the functionality of handy media players, digital cameras and GPS routing units to form one multi-use device. Many contemporary smart phones also comprises of high-resolution touch screens and web browsers. High-speed data access is provided by Wi-Fi (WLAN) and mobile broadband (2G/3G/4G). In recent years, the rapid development of mobile application markets and of mobile business has been drivers of smart phone recognition.

Although there isn't one perfect smart phone for the elderly, there are many features that make phones easier for the elderly to use. Technologies can play a colossal role in sustaining older people to escort them in a high-quality environment. Nine out of ten elderly people believed that phone (i.e. mobile and landline) as one of the most important devices in their existence. The mobile devices could be useful for communications and safekeeping purposes. For example, mobile phones enable the elderly users to remain connected

with their relatives and acquaintances. Such devices become vital predominantly during emergencies.

In the face of the convenience of smart phones especially to the elder population, there are still many annotations from this group regarding the interfaces of the existing mobile devices being intricate to use. In relation to these asserts, many studies have reported that older adults who want to send a text message but could not confidently do so. It is very regrettable when some elderly people do not even wish to use a smart phone owing to the reason that the interface is not very well designed for them.

The problem of complex functionality can be addressed by identifying the various necessities of a simpler interface. The user interface should possess simpler design along with the features like larger buttons and the color combinations which are suited for the elder population's vision. A noteworthy percentage of elderly people have meager vision, hearing inability and recollection problems, which frequently cause communication problems, such as failing to hear ringtone, dialing a wrong number, etc.

A survey was conducted to comprehend how older people interact with mobile phones and to identify the characteristics

of such ageing-friendly mechanism. The findings revealed that older people are passive users of smart phones; they experience apprehension of consequences of using unfamiliar technology. They mostly prefer design features that could give support to them due to their declining functional abilities. It is also highlighted that gender, socio-economic surroundings, ethnic and cultural background could have an effect on the preference for smart phones. The work focuses on the design approach that includes improving the graphical icons, multi-layered interface, supplementing the mobile interface among others. One significant finding is the need for labeled icons whose portrayal has a semantically close meaning. Such icon should have a natural, close relationship between depicted substance and associated functions.

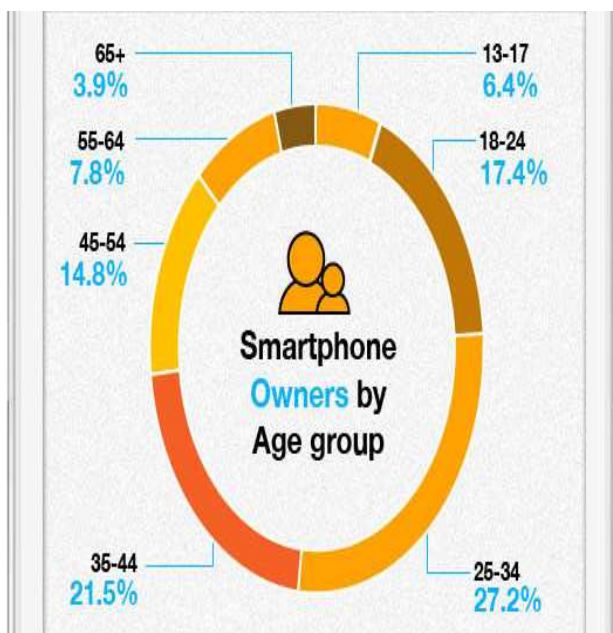


Fig1. Percentage of smart phone users according to age group

2. REALTED WORK

The previous researches and studies conducted led to the evolution of a few products like 'iBall Aasaan', 'Magicon Senior Duo', 'Samsung Jitterbug', etc. These products had the features which are designed keeping elderly people in mind. However, the designs had limitations and did not fulfill the criteria of qualifying as a smart phone. Keeping in mind that not all elderly people are technophobe and some of them can also be techno savvy, there is a need to design a smart phone which satisfies these criteria. The various positive and the negative aspects were observed and carefully analyzed to get the insight of the problems faced by the use of currently available high and low end phones.



Fig2. Currently available mobile phone for elders

The following drawbacks of the existing smart phones are observed:

a) Complex Interface

The interface design has the complexity issue, which is unsuitable for the use of elderly people. The smaller icons, compact text size and various other features lead to the problem related to the viewing, touching, etc. for the elderly.

b) Unfamiliar Mechanism

The tools and the mechanism like settings, in built functionalities utilized in the phones are unfamiliar. Hence, the elder people often find it difficult to cope up with these issues.

c) Calibration Issue

The size of the icon is usually small which often leads to the pressing of the undesired buttons. The scope of the touch is relatively small as compared to the need.

d) Emitting of Harmful Radiation

The cell phone's SAR is a measure of the amount of RF energy absorbed by the body when using the handset. In general, the Smart Phones have high RF, which is harmful for the elderly people.

e) Lack of Personal Security Feature

The existing smart phones do not have any personal security features, which safeguard the people.

f) Minimal Battery Life

The smart phones have the load of various applications and the background process, which leads to the drainage of the battery to immense extent.

g) Frail Ergonomics

The structure of the phone, distance between the key and various other physical anomalies of the phone results in the inconvenience to the old people.

h) Hearing Aid Compatibility

The smart phones may not have the HAC level specification as per the ANSI Standard of M3/M4. This is a must-have feature for the phone designed for elders.



Fig3. An elder lady having problem while reading the mobile screen because of small font size

3. WORK DONE

The following is a series of action that was carried out in order to finalize the detail of the product that is proposed for the elderly people. The work is divided in four different phases:

A. Planning the Research Activity

To obtain a simpler interface design of mobile phones appropriate for older adults various plans were formulated. The ulterior motive was to conduct the interview of the selected set of individual aged between 50 and 70 year. The interviews questionnaire was created which took into the consideration the important aspects of the design creation and the problem faced by these set of people.

B. Conducting the Interview and Survey

This stage involves the interviewing of a small group of older users on the mobile phones functionalities and interfaces. The intention was to discover the tribulations and concerns, the requirements and unnecessary features of a mobile phone from the older user's perspectives. Around 12 elder individual were interviewed and the data was collected for the reference of the additional studies. The segment also involved a survey on the users preferred features of a mobile phone. The questionnaire

included those features highlighted by the interviewees in the first stage. Twenty elder users aged over 50 year took part in the survey. They were asked to respond to a set of questions pertaining to their preferred mobile phone functionalities and interfaces. A concise session was also conducted to look for the older users' subjective opinions about the commonly used features of the device.

C. Analysis and Proposal

Based on the survey and users' subjective comments, some selected mobile phone features were shortlisted. Following features are proposed based on the investigation and analysis to make the phone user friendly for elderly populace:

a. Mobile OS:

The operating system should be developed based on Android owing to the reason that it is open source. This will reduce the cost of manufacturing of phone and in turn make the phone cost effective.

b. Voice Control:

Voice control can assist the elderly people for various functionalities like dialing number, answering call, navigating in menu, etc. The user can give verbal command for these functionalities.

c. High Hearing Aid Compatibility:

The phone design should comply by the M4 rating of the hearing aid compatibility.

d. Dual Emergency Button:

Functional button in case of emergency should be located on the sides of the mobile. It will serve two purposes:

- i. Single press of the button makes the alarm go off and save the GPS location for further references.
- ii. Long press of the button will send an emergency SMS to the predetermined contacts.

e. Mobile interface in Local Language:

As older people are more familiar with their local or native language, it will be more user-friendly if the mobile interface is provided in the local language also.

f. Multimedia Features:

The phone should be well equipped with the features like MP3 player, Video player, Image Viewer, Wireless FM and other similar features.

g. Lesser Infrared Radiation:

There is accumulating evidence that cell phones that operate on GSM networks emit significantly more radiation than the cell phones operating on CDMA networks. Hence, CDMA network should be preferred over GSM.

h. Sturdy Ergonomics:

The phone should be designed in the manner which should not only be strong and sturdy but also easy to handle with shaking hand.

i. Battery Life:

The use of **super capacitor** should optimize the battery life and enhance the charging speed, which is a must have of the phone.

j. High Contrast Text/Larger Icons:

The use of high contrast text and the larger icons will enable the elderly people to make use of the phone with higher convenience.

k. Medicine Reminder:

There will be an inbuilt feature Medicine Reminder like alarm. The reminder for the medicine can be set and can be handy for the time to time reminder of the intake of the medicine. Suppose reminder for medicine named X has been set, so the ringtone for the reminder will be "YOUR TIME TO TAKE MEDICINE X". It can be in local language also as preferred by the user.

l. Ringtone for Call or Message:

If the contact details of person named A are saved in contact menu then whenever person A calls then the ringtone will be "You have a call from person A".

So there is no need to look at the screen for elderly people as they may have vision problems. They can directly know whose call is there by the ringtone itself.

m. Contact Details:

There will be 3 inbuilt groups:

1. Assistances
2. Relatives
3. Others

As in current phones one needs to divide the contact details by making groups. But elder people may find it difficult to make the groups. So inbuilt groups must be provided They can save contacts for their help in assistances. They can save their relatives contacts in relatives groups.

n. Other Features:

1. Mobile Tracker
2. Flashlight/Torch
3. Entertainment/Games

The following design has been proposed based on the points that are mentioned above:



Fig 4 Simple Interface Designs

CONCLUSIONS

The by and large aim of the study is to get hold of a simple blueprint of a smart phone for elder users. In doing so, we distinguish findings from others functioning on understanding the problems faced by the elderly users and suggested design and features requirements. We extend those works by investigating on a wider range of population i.e. those involving older adults (50 years old and above) in terms of their views towards the functionalities and interface designs of the existing mobile phones.

FUTURE WORK

The functionality of the smart phone as proposed in the research above can be extended by adding some health monitoring devices like Blood Pressure Monitor, Heart Beat Monitor, etc. The further extension of the research can be carried out in order to analyze and find out the other aspects that can be included in the smart phone in order to not only increase its functionality but also its productivity for the elderly people. The research can be carried out with scientific approach to get an insight on the various sense appeals of the elders towards the system design of such phones. The vision, hearing aid, sensitivity, etc. can be optimized on the customizable basis.

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