

Design and Implementation of a Simple User Interface of a Smartphone for the Elderly

Ying-Wen Bai, Chun-Cheng Chan, and Chia-Hao Yu

Abstract—In this paper we present a simple and convenient user interface for the elderly with an open source system platform used in smartphones. This design provides a simplified interface, a large font, a big button and a simple user interface starter for easy operation, and offers the elderly a method for those who are more accustomed to dial phones. Our design includes an improved selective reply text message function, medication reminders, return appointments and a calendar with a list of the simple chores of daily living, and an easy to operate browser for sharing photos with relatives and friends.

Keywords—smartphones; elderly; interface; emergency

I. INTRODUCTION

According to the survey released by one report, smartphone ownership among the elderly has risen only modestly in recent years, from 11% in April 2011 to 18% in September 2013 [1]. In the current open source system platform for a smartphone interface, some will use the built in user choice and select “simple mode”. The purpose is to make the desktop smartphones configurations be more concise. The buttons, graphics and fonts are bigger, but this multi-level switching design with some interface screens are redundant, results in use difficulties for the elderly [2]-[3].

This design develops a single view of an open source system platform user interface for the elderly [4], which contains five functions: 1. Telephone, 2. SMS, 3. Cloud calendar, 4. Cloud photo, 5. One-button emergency. In addition, we propose to include three additional easily used features: (1) Single view, (2) Selective reply, and (3) Cloud application management.

II. SINGLE VIEW

Fig. 1 shows the single view features. Our design also provides easily used figures and a big button interface, in order that a user may make a call more efficiently, and in order to reduce the probability of any false clicks. Fig. 2 shows the simple dial pad.



Fig. 1 The single view.

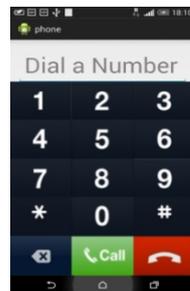


Fig. 2 The simple dial pad.

III. SELECTIVE REPLY

As relatives and friends sometimes will send text messages or notify a sick person of their concern and in order to remind the user of the precautions of their daily life, our design provides choices of an easy answer of one or two words for the elderly to choose in each situation. “Yes, please”, “No, thanks”, and “I understand,” are the three common answer choices as shown in Fig. 3.

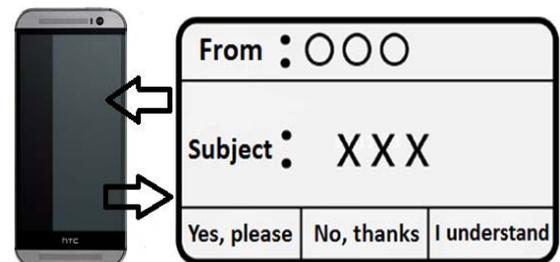


Fig. 3 The simple selective reply user interface.

IV. ONE - BUTTON EMERGENCY

Most elderly do not make too many demands on the mobile phone. The most important button is the “emergency button”, which can be used to request help when falling, wounded or confused to rapidly and directly contact relatives or SOS units. In addition, when calling relatives, friends or SOS units, this function will also send an SMS at the same time. The contents of the SMS will indicate the elderly’s current location [5]. Fig. 4 shows the dual-way of our one-button emergency function.

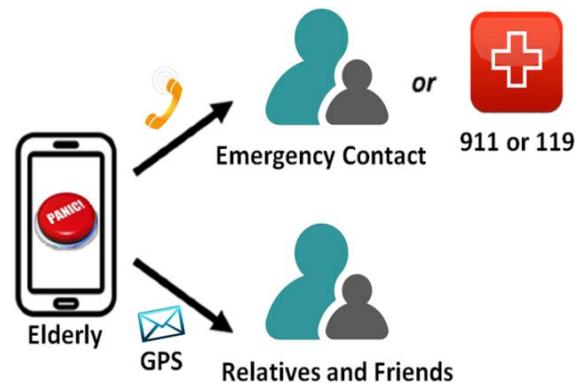


Fig. 4 The one-button emergency interface.

V. EXPERIMENTAL RESULTS AND COMPARISON

As we have modified the traditional SMS response, the user need not edit the text and can also quickly answer most messages. When the smartphone receives a message, it will

immediately display the source and content, and provide the three common answers for the elderly to select from: “Yes, please”, “No, thanks”, and “I understand”, so the elderly can tap any of the options in order to send an immediate reply to any text message. In addition, the user can also add or set other common words as an option, such as “I’m finished”, “Good night”, and “See you”. Fig. 5 shows the selective reply interface.



Fig.5. The selective reply interface.



Fig. 6. The one-button emergency interface.

Fig. 6 shows the one-button emergency interface. In order to prevent users from touching the emergency button by mistake, when the user taps the emergency button, it will complete a ten-second countdown prior to notifying the SOS center of an emergency [5]. If users inadvertently touch the emergency button, the user still can tap the cancel button within ten seconds to cancel the notification of the SOS center.

Most of the elderly do not reply to messages, because they will not edit the text on smartphones [6]. Table I shows our comparison of the advantages and the disadvantages of the common smartphones input methods.

TABLE I
A COMPARISON OF THE ADVANTAGES AND THE DISADVANTAGES OF COMMON SMARTPHONE INPUT METHODS

	Keypad text input	Voice input	Handwriting input
Advantage	Matches the user habits	Easy and fast	Simply to use
Disadvantage	Small keyboard input	Identifications inaccurate	Slow, takes lots of time
Suitability for the elderly	Most elderly cannot operate a keypad smoothly	Most elderly have an accent; cannot be understood	Most elderly have hands that tremble; and cannot identify which font to use

Table II shows the comparison of our design with others. We have listed several ways for the elderly to reply to the text messages, and we have focused on the convenience of use, practicality, accuracy and whether our design is easy to use. In addition, with a dual-level interaction operation, our selective reply function for the elderly provides the advantages of convenience, practicability, accuracy and easy to learn.

1. Convenience: Has a selective reply for the elderly, by using preset simple words or phrases.
2. Practicability: Has a selective reply for the elderly, as long as the elderly do not have dementia, as they can

easily tap to complete their instructions, this design is highly practical.

3. Accuracy: With a selective reply for the elderly, this design’s tap operation is fast, easy to use and has a high accuracy level.
4. Easy to learn: With a selective reply, as the elderly just click on one of the words, in order to quickly and easily answer any message, our design is easy to learn to use.

TABLE II
COMPARISON OF OUR DESIGN WITH OTHERS

Reply SMS ways for elderly	Keypad text input	Handwriting input	Voice input	Our design by selective reply to reply SMS
Convenience	Low	Low	Low	High
Practicability	Low	Low	Low	High
Accuracy	Low	Low	Low	High
Easy to learn	No	No	No	Yes

VI. CONCLUSION

In this paper, we present a design for the elderly of an open source system platform smartphone application launcher interface, with a simplified design whereby the elderly simply use a single view interface which has all the necessary functions. All options can be completed by simply tapping the screen at the most twice to complete each function. In addition, our design is intuitive, simple, uses big buttons, a big font interface, and has a quick reply function to reply to each SMS. In addition relatives and friends via the cloud can also assist the elderly to easily update the information in a smartphone. Our design provides photo gallery browsing for sharing photos and simple calendar reminder function for medication via the cloud, easy communication between relatives and friends of the elderly. Our design also provides a one-button emergency function, is convenient, and provides benefits for the elderly.

REFERENCES

- [1] Aaron Smith, “Older Adults and Technology Use,” Pew Research Internet Project, on-line at <http://www.pewinternet.org/2014/04/03/older-adults-and-technology-use>.
- [2] S. Verstockt, D. Decoo, D. Van Nieuwenhuysse, F. De Pauw, and R. Van de Walle, “Assistive Smartphone for People with Special Needs: the Personal Social Assistant,” 2nd Conference on Human System Interactions, 21-23 May 2009, pp. 331-337.
- [3] T. Laakko, J. Leppanen, J. Lahteenmaki, and A. Nummiaho, “Multipurpose mobile platform for telemedicine applications,” Second International Conference on Pervasive Computing Technologies for Healthcare, Jan. 30 2008-Feb. 1 2008, pp. 245-248.
- [4] Jae Gon Kim and Jun-dong Cho, “Huffman User Interface for Full Touch Screen Based Mobile Phones,” 2010 The 12th International Conference on Advanced Communication Technology (ICACT), 7-10 Feb. 2010, pp. 1021-1026.
- [5] Arisu An, H. -D. J. Jeong, Jiyoung Lim, and WooSeok Hyun, “Design and Implementation of Location-Based SNS Smartphone Application for the Disabled Population,” 2012 Sixth International Conference on Innovative Mobile and Internet Services in Ubiquitous Computing (IMIS), 4-6 July 2012, pp. 365-370.
- [6] Y. Hamano and N. Nishiuchi, “Usability Evaluation of Text Input Methods for Smartphone among the Elderly,” 2013 International Conference on Biometrics and Kansei Engineering (ICBAKE), 5-7 July 2013, pp. 277-280.