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Voice-mediated text messaging service: A possibility to enhance current text messaging service

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As a Human-Computer Interaction (HCI) design practice, this paper first drew on several scenarios for Short-text Messaging Services (SMS) on a mobile telephone technology. And a new prototype for SMS was given to participants. While the participants were using the prototype, the initial scenarios were extended by the participants' recognition of the new prototype, resulting in new scenarios for the future system development. This lightweight design practice was intended to educate HCI practitioners, in order to show the practicality of the HCI design process – task-artefact cycle framework.

1 Introduction

It is generally believed that a Human-Computer Interaction (HCI) technique to facilitate innovative user interface designs begins with by obtaining an understanding of the current work environment. The understanding of the work environment results in a series of task scenarios to identify representative tasks being embedded in the actual design specification. However, the understanding would be varied over time, so that the meaning of the current major tasks included in the current design specification would also be different over time. It implies that the HCI practitioners always keep up with targeted user's technology-in-use.

This concern has been well marked in task-artefact cycle framework (Carroll, Kellogg, & Rosson, 1991). A very important aspect of this framework is that a series of task scenarios used for the initial design cannot represent actual task situations, as soon as the initial design is introduced and actually used by people. It strongly indicates that, in task-based design approach, the constant monitoring of the actual technology-in-use is an important input to the system's further development.

Following this general picture of the HCI design process, this paper intended to show how the task-artefact cycle framework can be used in a practical design session, with an additional motivation that this practice can be used for educating HCI practitioners about the framework. Of course, there have been many design practices from this perspective; however, we revisit this framework for developing an innovative user interface for Short text Messaging Service (SMS) on a mobile telephone technology.

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2 Scenarios of the current SMS use

simple design exercise with 11 postgraduate students was carried out in the HCI design course at (blind for review) University. They simply chose the mobile telephone domain for their design practice, thanks to the wide use and the general understanding of the mobile telephone technology itself.

As the first step of this design practice, the eleven postgraduate students discussed the work environment of the current mobile telephone use. The two-hour session concluded the current mobile phone technology seems to be a combination of verbal and text-based communication, and, particularly, the lack of usability of SMS would be an opportunity to be improved in their design activities.

The design of a series of task scenarios that reflects the current SMS use was followed. Initially, 13 scenarios were developed; however, the following four scenarios were finally determined as the representative task scenarios for reflecting the current SMS use.

> *Scenario 1: John works for an insurance company as a salesperson, and he needs to deal with all sorts of people everyday. Many of his clients come from different country with different mother tongues. As a salesperson, he needs to communicate with them, understand their needs, and help them to solve all kinds of problems. Sometimes, different languages creates misunderstandings and often results in communication breakdown, especially, when he talks to them through the phone. In order to deliver quality services and communicate more effectively, he sends text messages to his clients rather than talking over the phone because it is harder to have misunderstandings when writing. Besides, written words are less ambivalent and better understood than spoken words. Once customers have familiarised themselves with reading and sending short messages, they often find that SMS is a useful way of exchanging information and keeping in touch with him*

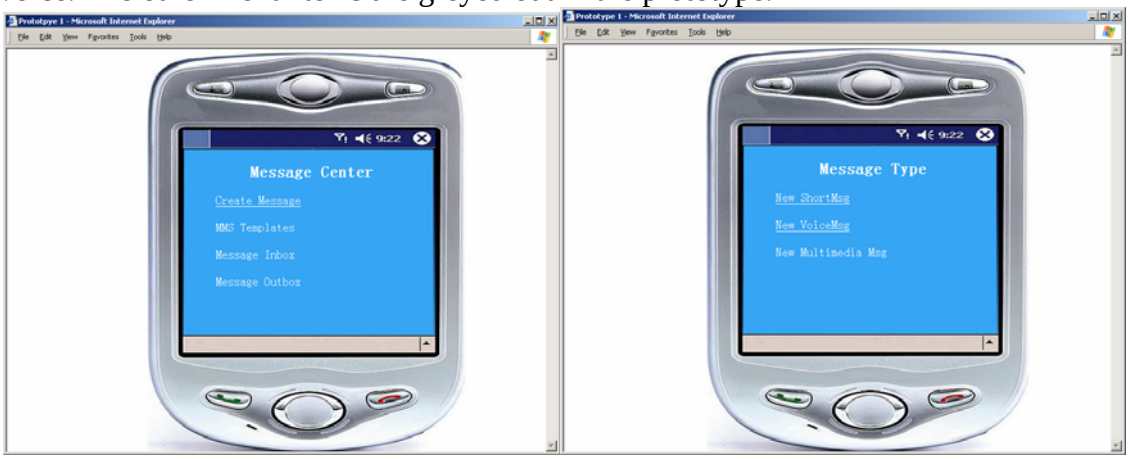
> *Scenario 2: Mark is a project manger who works for a construction company. He likes to use mobile SMS very much, instead of calling someone. He sends text messages to communicate with his colleagues, family and friends. Not because of the price of sending messages, but because he thinks SMS are simple and more convenient. Due to the nature of his job, he must go out monitor different construction sites on the daily basis. And the job also involves a lot of communication with his colleagues. In the daytime, most of his colleagues are very busy with their work, making phone calls to them means that they have to interrupt whatever they're doing and talk to him, and sending emails to them often means that either he has to wait for a few days to get an answer, or he doesn't get an answer at all, because his colleagues do not check emails regularly. In contrast, sending SMS to his colleagues would enable them immediately receive the messages, and they can also read and reply whenever it is convenient for them, so he think that using SMS is more convenient rather than the other ways if communication, it offers the best of both world.*

Scenario 3: Anna has a really close friend whose name is Peter. They know each other for long time. One day Anna suddenly wonders what peter is doing and where he is, and she notices she has a very special feeling about peter. She tried to tell him, but she could not tell what she feels deeply, because she is shy and feel embarrassing. What's more, she does not know what peter feel about her. She decides to text him, she types: love is starting from friendship, do you think we can arrive to the second stage from friendship?

Scenario 4: Molly needs to get hold of her husband quickly to remind him to pick up some milk before he gets home. Molly is also conscious about her husband talking on the phone while driving so instead of ringing, she sends a text message.

All the scenarios appear to reveal that the advantages of SMS over the verbal call are persistence of messages and less cognitive attention required. While the current mobile phones well support these task scenarios, the author(s) designed a new prototype to take care of these scenarios in an effective way.

The core functionality of this prototype enables people to compose text messages in the way they speak (blind for review). It is running on Microsoft Internet Explorer using voice-recognition software – Dragon Naturally Speaking™ 7.0. The left one in Figure 1 shows the initial status of the simulated SMS phone, as users push the message button on their mobile phone (the middle one in the three buttons). The menu items in the initial display consist of four, but only 'Create Message' can be activated by user's voice. The other menu items are greyed out in the prototype.



(a) (b)

Figure 1. A web-based prototype of voice-mediated phone: Step 1 (a) and Step 2 (b).

As soon as the users speak out 'Create messages' or just 'Create', the right display in Figure 1 appears. If the users want to compose a text message with keyboard, they can choose the first menu item 'New ShortMsg'; otherwise they talk aloud 'New VoiceMsg' or 'VoiceMsg', leading to the left one in Figure 2. It allows the users to compose their text messages in the way they talk to someone. When the users finish composing their text messages, they just speak out 'Continue', and then the interface as

shown in the right display in Figure 2 demands them to specify the telephone number of the recipient. This is also activated via voice without any additional button click.
In effect, this prototype appears to yield two advantages over the current SMS phone. Firstly, as the keypad use is minimised, the physical design constraint of the current mobile phone can be minimised. Second, the interaction procedure for 'Texting' is more intuitive to use and the interaction steps can be dramatically reduced.

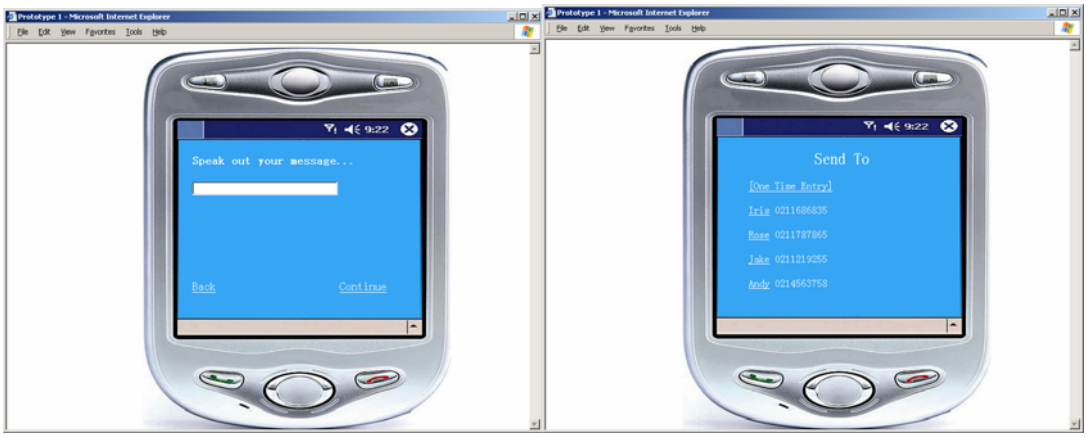


Figure 2. A web-based prototype of voice-mediated phone: Step 3 (a) and Step 4 (b)

3 A wicked step: Exposing to the new prototype

In this stage, the eleven postgraduate students, who previously took part in the initial scenario generation, were asked to use the new prototype. This forced use was expected for the participants to generate future design requirements based on the new prototype, perceiving further advantages over the current SMS phone. That is, this 'wicked' process was intended for our postgraduates, who developed the task scenarios of the current SMS use, to perceive how much their initial scenarios did not represent the new task situations.
The simulation of the voice-mediated SMS phone was placed onto a Tablet PC, and tested in a mobile mode. Each participant was asked to use the prototype in twenty minutes.
In overall, they reported that this voice-mediated Texting experience in a mobile situation was very attractive, with a wide agreement that talking to a mobile phone is a good idea, if it can overcome some of the problems with current practices, such as accuracy and reliability of voice recognition.

4 Current state of the project and future work

Naturally, if a new technology is very likely to be accepted by users, they will usually lead more positive attitude or feeling of the new technology. Therefore, we simply expected our participants would like to generate more positive task scenarios subjected to the new technology. For this reason, we asked the same 11 postgraduates to make other scenarios one week later. The following are the newly generated scenarios.

New scenario 1: Rachel is driving to home now, and she wants to let his partner know where she is now. She just sends a short message "I'll arrive in five minutes", because she expects this is cheaper and convenient.

New scenario 2: Karen – a full time office worker – and her husband John – a self-employed fitter –have three school aged children. As John works all over the city and never knows where he'll be finishing or when. Karen usually texts him each afternoon to decide who will be able to, or have to collect the children from after-school care on time. John often has his phone off because he welds near dangerous gases but regularly checks for texts.

New scenario 3: Jim who is a barrister has two children and is widowed. He is often out of the office in court. Jill, his 10 year old daughter has chronic asthma. Jim cannot easily be reached because of his busy schedule and can't take calls while court is in session. He leaves his mobile set to vibrate and has instructed school to always text in the first instance if his daughter is unwell. This way vital personal and office messages reach him in court without the phone ringing and disrupting court activities.

New scenario 4: Thelma who is a widower is given a mobile by her son so she can contact him. Her son is difficult to get a hold of except with his mobile but often can't take calls. He wants her to text him everyday to make sure she is well starting the very next day. Thelma has arthritis, has never learned to type and has failing eyesight. She endeavours to comply with her son's request though. Thelma finds the buttons too small to manipulate and has difficulty reading what she has typed on the screen. She makes a mistake in her typing but can't think how she might fix it as there are so few buttons to push and she does not find using the mobile obvious. Thelma gives up in frustration.

We initially expected that the newly generated scenarios would be more positively skewed to the voice-mediated SMS phone use. For example, Scenario 1 and 4 intimate that the new technology was reflected in their new task scenarios. However, at the current state of this project, it is very difficult to tell how much the newly generated scenarios reflect the new work contexts.
As for the future work, we are currently collecting more extensive task scenarios of the current SMS use, and planning some controlled experiments with the voice-mediated SMS phone. We expect that the two outcomes will provide more quantitative results of the practicality of the task-artefact cycle framework.

References

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