FACT-V: Universal Access and Quality of Interaction for Automatic Teller Machine (ATM)

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Abstract. In this paper we showed our ATM named "FACT-V" to improve universal access and quality of interaction from two viewpoints: (1) input methods for the blind to operate complicated function and (2) ergonomic design of ATM for wheelchair users.

1. INTRODUCTION

Although Automatic Teller Machine (ATM) is widely in use and very convenient, it has been shown that users with disabilities and elderly persons face difficulty in operating ATM.
Some researches have examined the ATM based on the concept of barrier free and/or universal design. But there has been no support for blind people to operate complicated functions such as remittance with ATM which is common in Japan but not in other countries. There have also been complaints from wheelchair users in Japan for inadequate design of ATM.
In this paper, we propose the ATM named "FACT-V" (Fig. 1) to progress universal access and quality of interaction in two aspects: input methods and access by wheelchair users.

2. INPUT METHODS

2.1. General input and User Interface

Operation in general mode of FACT-V was done with touch screen and voice guidance. User interface of touch screen is consistent with the arrangement of the keys. Detailed guidance is presented for beginner users by using video information on touch screen or using selection mode of detailed voice guidance on the alternative handset. Touch screen is 12 or 15 inch wide so that a user can read the button and font easily. For people with low vision, the font size of the screen can be changed. For people from abroad, our ATM design has bilingual mode; Japanese and English.

Fig. 1. FACT-V

2.2. Alternative Input

Especially for people who are blind, we need to establish the alternative input that can be used for the complicated operations such as a remittance and use of Japanese characters. Although there are some simple input methods like EZ Access, they seems to waste much time for such complicated operations. There have been phone-based interfaces for customers. However, the current system

using phone-based interfaces have some problems. For example, there is no way to repeat the guidance in such system [Law 00]. We used the phone-based device as an alternative input and designed the adequate ATM system.

Conventional ATM has a handset for inquiry to bank personnel. We put the number buttons on the handset to make it as an alternative input method instead of touch screen mainly for those who can not see or who have difficulty in looking into the screen (Fig. 2). Users can operate ATM with the keys of the handset and confirm guidance by the sound from the handset. We verified the quality of interaction with some experiments and improved the system of guidance for easy and simple operation (detailed explanation is shown in another paper [Kobayashi 00]). The results of the operations are also shown on the screen synchronously with voice guidance. Therefore, the user with low vision can confirm both on screen and with voice guidance.

3. ACCESS BY WHEELCHAIR USERS

Many ATMs in Japan have handrails in front of their bodies for people with physical impairment. However, the research of the 2nd author's group showed that in reality the handrail tended to be an obstacle. We decided not to use the handrail and thus make its body much simpler. In addition, the front panel of the ATM was designed to be a curved surface underneath its body for an easier access by wheelchair users (Fig. 3). They can come alongside to reach to the ATM much closer as well as to operate all of their tasks without standing in their wheelchairs.

Fig. 3. Access by a wheelchair user

4. CONCLUSION

We completed the design of input method and ergonomic design for wheelchair users in our ATM model named "FACT-V". In the future, we would like to continue further research on the universal access of ATM from various aspects, such as the use of those who have multiple impairment. We will also examine other banking method, such as mobile terminal and mobile phone.

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