Multi-user Network Games for the Visually Impaired

Using Tactile and Auditory Interface to Graphical Screen

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1. INTRODUCTION

Multi-media functions have rapidly become widespread and accessible, and network communication has been further popularized by performance improvement of the PC (personal computer) and the progress of GUI (Graphical User Interface). But visually impaired people have few chances to utilize these new media and networks, because of the lack of online access tools to graphical screen (INA 1999). It is to be more difficult for them to work in cooperation with sighted people. So, we studied and developed a non-visual access method to a graphical screen through tactile and auditory sense instead of visual sense, and applied it into multi-user network games as a prior sample of future CSCW (Computer Supported Cooperative Work) in mind.

2. NON-VISUAL ACCESS METHOD TO GRAPHICAL SCREEN

For the purpose of non-visual access to graphical screen, we developed an online real-time driver-software, which returns screen coordinate through a touch-panel called Nomad (Quantum 1994). Incorporating Nomad, our driver-software, and speech synthesizer, we developed two types of network games for the Visually Impaired. One is a board game called “IGO”, and the other is a card game called “SEVENS”. In both games visually impaired people were able to play with sighted people.

3. BOARD GAME (“IGO”)

“IGO” is a fight type game by two players in the distance via the Internet. We used a tactile graphic of “IGO” board attached on Nomad as shown in Figure 1. The progress situation such as the position of stone and manipulations were guided through synthetic voice. An executing screen of the client/server windows is shown in Figure 2.

4. CARD GAME (“SEVENS”)

“SEVENS” is a multi-user game by two or six players in the distance via the Internet. We used a embossed tactile graphic of “SEVENS” card layout as shown in Figure 3, attached on Nomad. The progress situation such as the position of cards and manipulations were always guided through synthetic voice. An executing screen of multi-user windows is shown in Figure 4.

5. DISCUSSION/EVALUATION

“IGO” seemed to be a more difficult subject for novice blind users than “SEVENS”; examinees found it difficult to memorize and recall the layout of black/white stones, and the assistance of voice guide was required with high frequency. Novice blind users tended to put a stone in the wrong place late in the game and subsequently lost. However, we consider that training and habituation will lead blind users to enjoyment and occasions of victory. Although the direct access interface in our sample games was a problem-oriented one, we could confirm that an attachment of one communication aid tool improved the human interface and made a cooperative work possible for blind users. These multimedia communication interfaces would open the gateway into cooperative works for blind users in the near future.

6.CONCLUSION

We constructed “IGO” and “SEVENS” for visually impaired people to achieve communicative and cooperative subjects, and confirmed that the online real-time tactile/auditory aid could support them to communicate graphical information and to execute a cooperative work with a sighted person. As a result, our driver-software for Nomad was proved to be very easy and effective to create a new interactive non-visual and

nonverbal interface for applications, such as our board/card games.

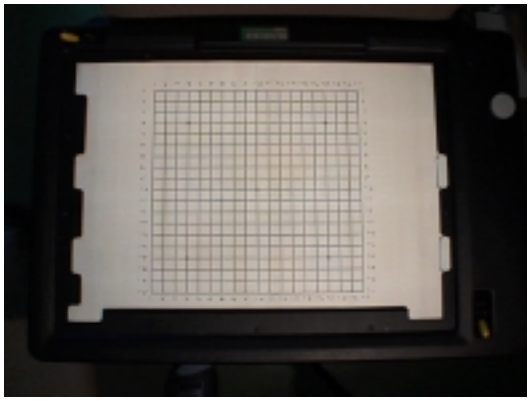

Figure 1. Nomad Pad attached with an embossed tactile graphic of "IGO" board

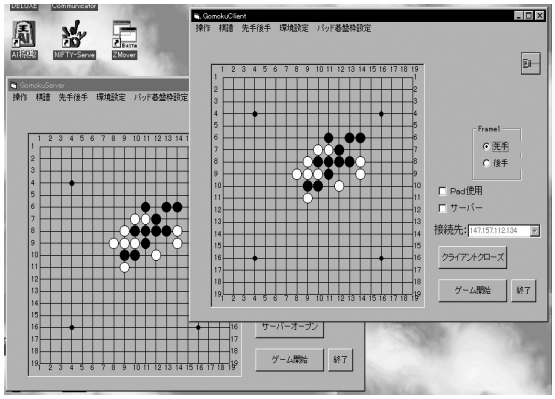

Figure2. Client and server windows of "IGO"

Figure 3. An embossed tactile graphic sample of "SEVENS" card game

Figure 4. Multi-user windows of "SEVENS"

7. REFERENCES

Quantum Technology, Pty Ltd.(1994), Touch Blaster Nomad Installation and User Guide for Nomad Pad and TouchBlaster software.

INA, S.(1999), A Support System for the Visually Impaired Using a Windows PC and Multimedia. INTERACT'99, Vol2,37-38

