Development of Communication aids for Deaf-blind people using Smartphone

Shunsuke Takeno, Ryoji Yukino, Yutaka Tange, Yoshitaka Arakawa
tange@maizuru-ct.ac.jp
Department of Electrical and Computer Engineering
Maizuru National College of Technology

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1 Introduction

According to the survey by the Ministry of Health, Labour and Welfare, there are 22 thousand people who are deaf and blind among 3.5 million disabled people in Japan [1, 2]. The deaf-blind people have difficulty in talking with other people. Although there are various means to communicate with them including sign language, both the sender and the receiver need to learn the means.

Therefore, in this study we have developed the interpreting system between the deaf-blind people and not one and so, we focused on the finger-braille that is one of the means used by the deaf-blind people.

In this paper, we report the system we have developed for the deaf-blind people and its evaluation.

2 About Smartphone

The smartphone is a portable information terminal based in personal computers. The user can add or remove easily the applications on the market. Windows phone, iPhone and Android are known as smartphones now. As a feature of these smartphones, the development environment has been provided by each company and people can easily develop applications that use Bluetooth module, camera and microphone etc…

In this study, we have built the system that uses the Android OS provided by Google Inc. because it has more documents for development than the others and we can obtain the its development environment for free.

3 Advantages of Finger Braille

Finger braille was devised by Ms. Fukushima in 1981. It is a method for the deaf-blind people to communicate with others and uses six fingers. Figure 1 shows a correspondence between finger braille and conventional braille using the case of kana, Japanese syllabaries. It is more suited for communication than conventional braille. Moreover, like conventional braille, it is easy to use on a computer.

![Figure 1: Compare Finger Braille with typically Braille](image_url)
4 System Design

Figure 2 shows the system design we have developed using finger braille. The system is composed of a smartphone and an interactive device for finger braille. The deaf-blind people can input and read finger braille using the device. The smartphone translates finger braille data sent from the device into kana and outputs them in a voice or a text. Moreover, the input from a document or a sound which the deaf-blind people cannot use usually is also made possible by the use of the microphone and camera which were carried by preparing an external server as an input to a smart phone.

Figure 2 : System Design

5 User Evaluation

We requested the teachers of the school for the blind and the deaf in Maizuru, Kyoto Prefecture to evaluate the system we developed. Figure 3 shows users’ evaluation. The results are as follows.

- The system that enables us to communicate without learning finger braille is very useful.
- Since the characters displayed are small, we want them to be larger and clearer.
- We want you to hear opinions from the deaf-blind people and improve the system.

Figure 3 : Users’ Evaluation

6 Conclusion

In this study, we have developed the communication system for the deaf-blind people, which was highly rated. Moreover, we can expect other handicapped persons to use this system with a different device adapted to each disability instead of finger braille device. In short, this system is both convenient and versatile.

7 Reference