

Finger Braille Teaching System for People who Communicate with Deafblind People

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Abstract - Finger Braille is one of tactual communication media of deafblind people. In Finger Braille, index finger, middle finger and ring finger of both hands are likened to keys of a Braille typewriter. A sender dots Braille code on the fingers of a receiver like whether he/she does the type of the Braille typewriter. Then the receiver recognizes the Braille code. Deafblind people who are skilled in Finger Braille can catch up with speech conversation and express various emotions. Because there are small non-disabled people who are skilled in Finger Braille, deafblind people communicate only with interpreters. In this paper, we developed a Finger Braille Teaching System and designed a teaching interface which taught clauses explicitly. The Teaching System recognized non-disabled people's speech and converted to Braille code. By parsing the Braille code, the Teaching System retrieved clause information and segmented the Braille code into clauses. Then the dot pattern of the Braille code was displayed. By observing the dot pattern, non-disabled people dotted Finger Braille to deafblind people. An evaluation experiment between a blind person who was skilled in Finger Braille and two non-disabled people who were non-skilled in Finger Braille was carried out. The results showed that the fundamental functions (speech recognition, conversion to Braille code and clause segmentation) were practicable; the non-disabled senders could dot Finger Braille accurately and communicate with the blind receiver directly. Therefore it was considered that the Teaching System was effective.

Index Terms - deafblind, Finger Braille, teaching system, communication aid.

I. INTRODUCTION

Recent surveys (The Deafblind Association of Japan, 2006) estimate that there are 16,354 deafblind people in Japan. Communication is one of the largest barriers to their independent living and participation. Deafblind people use many different communication media according to the age of onset and what resources are available to them. "Yubi-Tenji" or Finger Braille is one of tactual communication media of deafblind people (see Fig.1). In Finger Braille, index finger, middle finger and ring finger of both hands are likened to keys of a Braille typewriter. A sender dots Braille code on the fingers of a receiver like whether he/she does the type of the Braille typewriter. Then the receiver recognizes the Braille code. Deafblind people who are skilled in Finger Braille can

catch up with speech conversation and express various emotions, because of prosody of Finger Braille [1]. Because there are small non-disabled people who are skilled in Finger Braille, deafblind people communicate only with interpreters. Thus the participation of deafblind people is greatly restricted.

Recently, some Braille input devices were developed [2], [3]. These devices let deafblind people wear gloves or an keyboard to input his/her Finger Braille and actuators to output non-disabled people's speech converted to Finger Braille. In such supporting devices, deafblind people are burdened with wearing the sensors and the actuators, and must master new communication system with the supporting devices.

Objective of this study is development of a Finger Braille supporting device which respected skin contact communication, because skin contact is only a non-verbal communication for deafblind people. Fig. 2 shows the concept of the Finger Braille supporting device. The largest features of this study are that deafblind people and non-disabled people who are non-skilled in Finger Braille are communicate by usual Finger Braille and all sensors are worn by non-disabled people. This supporting device includes two assistive systems; one is a Teaching System, the other is a Recognition System. The Teaching System recognizes non-disabled people's speech and displays the dot pattern of Finger Braille. Non-disabled people dot Finger Braille by observing the dot pattern [4]. The Recognition System senses deafblind people's Finger Braille and converts to speech [5]. Thus deafblind people don't have to aware of the supporting device and may communicate by usual Finger Braille without interpreters.

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