Mobile Accessible Japanese Sign Language Dictionaries over the Internet

Kazuo Kamata, Maki Saito, Liang Zhao, Takeaki Shionome, and Hideo Yamamoto
Department of Information Science, Utsunomiya University
Kazuo Kamata, Utsunomiya University, 7-1-2 Yoto Utsunomiya, Japan, kamata2@twins.is.utsunomiya-u.ac.jp

1. Introduction

A Signed language has essentially several types of variation in signs as other natural languages. Typical variation factors are region, age of a person (signer), and context in use (formal and informal situations) [1]. Deaf people go to everywhere and meet other deaf and hearing people for work, leisure, and other activities as well as hearing people. When they go another place, they sometimes need regional language information for communication. In this situation, they need a certain kind of dictionary for getting information about sign words.

In this study we consider an electronic dictionary system for Japanese Sign Language (JSL) that a user can access by a usual mobile videophone through the Internet. The present information and communication technologies (ICTs) allow the distributed structure for a dictionary. The system will be able to cope with variation in JSL signs. When every sub-dictionary is implemented at local deaf community and has information about sign, then a user can access the system and get the information through the mobile videophone. We have implemented an experimental single JSL dictionary system for the purpose of further investigation. We show the functionality of the system, and the features for an operational interface of mobile videophones. We also show results for preliminary evaluation testing with deaf people, and hearing signed language interpreters.

2. Dictionary system description

2.1 System function

The present ICTs allow us to build the dictionary in a distributed structure. Our target system, the final dictionary system, consists of many sub-dictionaries located at every region, or every local deaf community. That is, every deaf community builds and maintains a sub-dictionary that contains information about signed language used by deaf people in the region. Figure 1 shows a diagram for the final distributed dictionary system over the Internet. The system provides information about regional signs to those who need them whenever they want, and wherever they are.

Getting information about an intended sign effectively is very important for an electronic dictionary [2,4]. There are mainly two approaches to retrieve a sign word. We implemented these two retrieval methods. The first one is the method with a Japanese gloss for a sign word. A user inputs the Japanese gloss for a sign, and the system searches it (Gloss search). The other one is based on the description parameters for a sign. A user specifies whole or some of parameter values for an intended sign. The system in this case searches a sign that has the same parameter values as specified (Parameter search). We use 23 parameters for the description. We also implement a modified version of the parameter search that allows partial match of specified parameter values. The modified search increases efficiency in the case of incorrect parameter value specification.

2.2 Experimental system

We have implemented a small size single JSL dictionary for a mobile video network (Internet). The dictionary has 72 JSL sign words at a server that is connected to the network. A user can access the dictionary with a mobile videophone, and retrieve sign words by either the gloss, or the parameter search as shown in Figure 2. A user can select one of playback modes: streaming; and file download ones. The display size of the mobile videophone is usually around 2 inches, and it affects the intelligibility of signing motion pictures [3]. We implemented captioning function of signing playback picture for easy understanding. Certain captions of sign description parameters such as movement, handshape and others are shown on the display together with a signing motion picture.
3 Discussion

We have done a preliminary evaluation testing for the dictionary with deaf and hearing signed language interpreters. They recognised the potential and usefulness of the dictionary system. An operational interface of a mobile videophone, and contents of the dictionary need further investigation and improvement. One of most difficult issues is how we build total dictionary system over the Internet. Every local deaf community must collaborate well, and moreover we need a key organisation for system realisation. One of candidates is Deaf Association of Japan (Nation wide deaf organisation).

4 Concluding remarks

We have implemented a small size JSL dictionary over video networks. An electronic dictionary has flexibility enough for satisfying various users needs [2]. In the network dictionary system, a user can access it by a usual mobile videophone by two retrieval methods (gloss and parameter search methods). The results for preliminary evaluation testing have shown the potential possibility for usefulness of the dictionary for deaf and hearing people. The basic concept for the system is a distributed dictionary structure that will cope with regional, age, and other variation in signs, and will also realise easy and flexible maintenance of the total system. We have just implemented one single small dictionary for a mobile video network, and have done the preliminary experiment. There remain many issues to be discussed for final nation-wide distributed dictionary system accessible by mobile videophones in a ubiquitous computing situation. The system will have the feature of dynamics and a potential enough for providing JSL information for deaf and hearing people.

References