Bilingual Sign Language Dictionary for Learning a Second Sign Language without Learning the Target Spoken Language

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Abstract

This paper describes a bilingual sign language dictionary (Japanese Sign Language and American Sign Language) that can help people learn each sign language directly from their mother sign language. Our discussion covers two main points. The first describes the necessity for a bilingual dictionary. Since there is no "universal sign language", or real "international sign language," deaf people would need to learn at least four languages if they want to talk to people whose mother tongue is different from their own: their mother sign language, their mother spoken language (as an intermediate language), the target spoken language, and the sign language fot the language in which they wish to communicate. The two spoken languages become language barriers for deaf people, and our bilingual dictionary will remove these barriers. The second describes the use of computers. As the use of computers becomes more widespread, it has become more convenient to study using computer software and/or the Internet facilities. Our dictionary system provides deaf people with an easy means of access using their mother-sign language so that they don't have to overcome the barrier of learning the target-spoken language. It also provides a way for people who are going to learn two sign languages to look up new vocabulary. Further, we plan to examine how our dictionary system could be used to educate and assist deaf people.

1 Introduction

Nowadays many deaf people have an opportunity to study abroad and to learn a foreign language. But there are three barriers they must overcome to acquire the target sign language: the first barrier is their mother-spoken language; the second is the target-spoken language; and, the last is the target-sign language.

Generally, deaf people are bilingual since they have to learn their mother-spoken language and its sign language. In the United States, many universities offer American Sign Language(ASL) as a second foreign language. It is recognized as an independent languages in the U.S. In Japan, Japanese Sign Language(JSL) has not yet been recognized as an independent language.

One of the main purposes of our dictionary is to remove these language barriers and help deaf people improve their sign language abilityies based on their spoken language(Japanese or English)[Suzuki E., and Kakihana K. 2002].

2 American Sign Language (ASL) & Japanese Sign Language (JSL)

2.1 American Sign Language (ASL)

American Sign Language (ASL) is a complex visual–spatial language, used by the deaf community in the United States and English-speaking parts of Canada (Nakamura (1)). The number of ASL users is almost five-hundred thousand. It is the native language of many hearing-impaired people, as well as some hearing children born into deaf families. The ASL is derived from the Native American sign language, with some words taken from French sign language.

ASL shares no grammatical similarities to English and should not be considered in any way to be a broken, mimed, or gestural form of English. In terms of syntax, for example, ASL uses topic-comment syntax, while English uses subject-verb-object.

2.2 Japanese Sign Language (JSL)

There are two main sign languages in Japan: "Japanese sign language," and "Japanese oral sign language." The former is used by deaf people, and the latter is mainly used by volunteers. It is a

type of pidgin-signed Japanese, often used in formal situations, lectures, and speeches. The main difference between the two is the sequence of the words. Japanese sign language syntax is like spoken English, using subject-verb-object, whereas Japanese oral sign language syntax is like spoken Japanese, using subject-object-verb. In this paper, since we will only discuss the sign language word dictionary and not with syntax, we will use the acronym "JSL" to refer to both Japanese sign languages.

2.3 Language Selection

As previously mentioned in terms of syntax, ASL has more in common with spoken Japanese than with English. For example, in spoken English, they say "What is your name?" and ASL signs "name"+"what". This word order is identical to oral Japanese. On the other hand, in JSL, the word order is "what"+"name" which is more like spoken English. That is one of the main reasons for us to focus on ASL as a bilingual dictionary. Another reason is that ASL is the fourth most commonly used language in the U.S.A. We assume that it is easier than learning another sign language for those who already know Japanese sign language (JSL) and are planning to learn a second sing language(Nakamura (2)). Further, according to some TV programs and newspaper reports, JSL is becoming more popular among Japanese recently. Therefore we decided to provide a bilingual dictionary for those who wish to learn JSL and ASL.

3 Digital sign language dictionary

3.1 The problem of digital sign language

Recently many digital dictionaries are available on the Internet or on CD-ROM. Some of the electronically accessible bilingual dictionaries and corpora include: English-French, German-English, Albanian-Spanish, English-Romanian, Greek-Russian, English-Spanish, English-Russian, English-Estonian, English-Hungarian, and Esperanto-English. These on-line dictionaries are easy to access by searching an Internet dictionary site.

Almost all of there digital dictionaries illustrate signs using cartoon-animations and not human gestures. We tried to make two types of dictionaries, and decided that the animations were more difficult to understand than human gestures especially by beginners. On the other hand, people who have been learning the sign language for a long time might be able to understand animated sign languages.

3.2 The purpose of our dictionary

Almost all of these digital dictionaries are for the people who can read and write their mother language fluently and not for those who have a disability with their mother tongue. The mother tongue for those who were born deaf is sign language, especially for those born into a deaf family. On the other hand, the main language for those who were born deaf but whose parents are not deaf is the parents' spoken language. The problem for these deaf children is that it is difficult for them to learn their spoken language in their country. Since their parents use their spoken language and have become used to using sign language for their child, a child who is deaf must learn at least two languages. When they want to or have to learn a foreign language, the foreign language becomes the second foreign language. The target sign language then, becomes their third one.

Sign language is believed to help those who want to communicate with people who have another mother tongue. We think that the second sign language helps deaf people to communicate with each other without learning the target-spoken language.
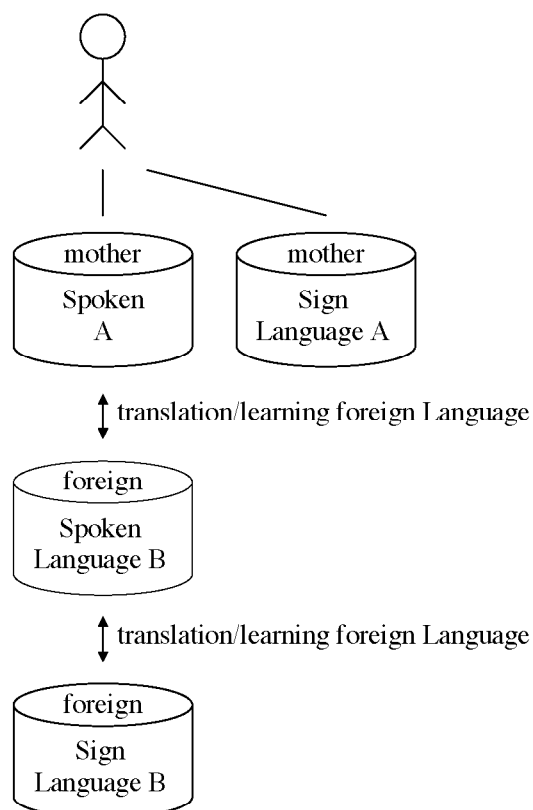

Figure1.Learning Sign Language Flow

We believe that our digital dictionary will remove the barriers for the deaf to learn another

foreign language. The users can choose the language (Japanese or English) when they want to search for signed words. They select the word from their favourite language and just look for it in the index. Our dictionary shows both Japanese and American sign languages with moving pictures taken from three directions.

4 Dictionary Configuration

4.1 Overview

Figure 2 shows our bilingual dictionary configuration. As you can see, we can search each sign language using either Japanese or English words. Thus, we can describe our system as a quadra-lingual dictionary system. Once you choose a word, our dictionary will show you the corresponding Japanese and American sign languages.

Figure2.Dictionary configuration
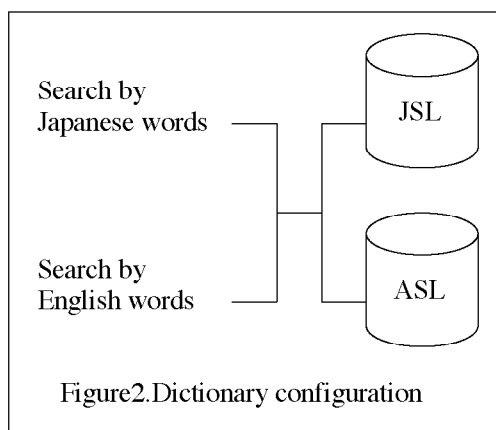
4.2 Search Flow

When this dictionary system starts up, the menu displays the languages the user can select (Fig. 3). As shown in Fig. 3, users can select "Exercise" from the menu after first learning some signs. Upon the selecting the language, the first characters of the indices are shown in a conventional alphabetical arrangement (Fig. 4).

Figure3. System Menu

Figure 4. First Characters of Japanaese Indices

For example, if Japanese is selected, the first characters of the indices are arranged in dictionary order (Fig. 4). While using Japanese to search the dictionary, the user can check the equivalent English words and ASL. Thus, they can learn spoken English and ASL simultaneously as shown in Fig. 5.

Figure 5. Dictionary Screen

The users can return to the Japanese indices and English indices just by clicking a button on the display using their mouse, as shown in Fig. 5. An example of the English indices that appeared on the screen is shown in Fig. 6. The resulting screen is how the screen looks like after the user clicks "w" for the search word in ASL. Also in Fig.6, you can see that English words are displayed befpre Japanese words.

Figure 6. English Indices

4.3 Applications

We have improved the previous dictionary by adding an explanation of each sign operation and providing an example sentence for each word to enable natural language learnng.

As shown in Figure 7, eight more buttons have been added to the bilingual sign language display. Each are explained in Japanese and English and the example sentences are in Japanese and English.

Figure 7. Improved Dictionary Screen

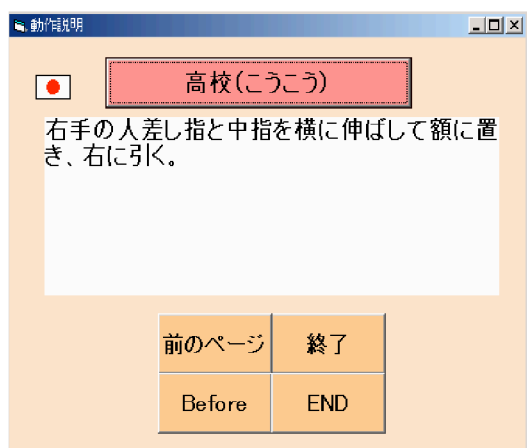When you press the "Explanation in Japanese" button, a new screen appears as shown in Figure 8.

Figure 8. Explanation of signing in Japanese

5 Conclusion and future work

We have already completed a Japanese sign language dictionary with 50 entries that came from the JSL dictionary for beginners [Yonaiyama and Ogata 2001]. We also used corresponding American sign language entries, but some of the words do not exist. We are planning to add more Japanese and American sign language motion pictures. The cross-referenced features in our dictionary offer students, sign language learners, and deaf people, a genuine two-language resource that enhances the opportunity to obtain communication skills in both modes. We know that introducing ASL in the English learning classroom attracts the students' interest and is effective in learning a foreign language[Pauly, M., Miyao M., and Ikeguchi C. 2003]. As mentioned earlier, the word order in ASL is from general to specific and from large to small, similar to the Japanese language. This results in easier learning of each language.

We are currently working to expand our bilingual dictionary to a courseware dictionary. We are planning to test it and obtain feedback and suggestions. At first, we are going to expand it to conversational sentences, which will help users identify signs and their meanings within specific contexts.

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