

Japanese and American Sign Language Dictionary System for Japanese and English Users

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Abstract

We discuss the basic ideas behind a Japanese and American Sign Language Dictionary System for Japanese and English users. Our discussion covers two main points. The first describes the necessity of a bilingual dictionary. Since there is no “universal sign language” or real “international sign language,” if Deaf people should learn at least three languages: they want to talk to people whose mother tongue is different from their owns, the mother sign language, the mother spoken language as an intermediate language, and the sign language in which they want to communicate. The second describes the use of computer. As the use of computers becomes widespread, it is increasingly convenient to study through computer software or Internet facilities. Our dictionary system provides Deaf people with an easy means of access using their mother-spoken language. It also provides a way for people who are going to learn two sign languages to look up new vocabulary. We are further planning to examine how our system could be used to educate and assist Deaf people.

1. Introduction

Although monolingual sign language dictionary systems for American, Spanish, Japanese and others have already existed, there is none with entries for two or more languages. In this paper we describe a bilingual Japanese-American sign language dictionary system. This dictionary system contains Japanese and English indices to derive both Japanese signs and American signs. We have made the first trial Japanese-American sign language dictionary system. We plan also to develop this bilingual dictionary further to facilitate access and language acquisition for sign language learners.

Recently some digital sign language dictionaries are available either through Internet or digital devices. Many of those utilize animation to show the sign language despite animation’s reputation for being friendly for beginners but inadequate at showing each sign in detail. In sign languages, it is important to display the face expression and also the specific finger movement. Motion pictures introduce how signs are used in each sign language structure and present clear, explicit directions. So we decided to use human motion pictures instead of animation in order to show each sign in more detail.

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 that is used by the Deaf community in the United States and English-speaking parts of Canada [Nakamura (1)]. The number of ASL users is almost 5 hundred thousand. It is the native language of many Hearing-Impaired people, as well as some hearing children born into Deaf families. 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 has topic-comment syntax, while English uses Subject-Object-Verb.

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 and is a pidgin signed Japanese, often used in formal situations, lectures, speeches. The main difference between the two is the sequence of the words. The syntax of “Japanese Sign Language” is like spoken English using Subject-Verb-Object, and the syntax of “Japanese Oral Sign Language” uses spoken Japanese order, that is, Subject-Object-Verb. In this paper, since we deal only with a sign language word dictionary and not with syntax, we will use the word “JSL” to refer to both Japanese sign languages in this paper.

2.3. Language Selection

As mentioned in the previous section, 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?,” while ASL signs “name”+“what,” whose word order is completely the same as oral Japanese. On the other hand, the word order is “what”+“name” in JSL, which is more alike spoken English. That is one of the main reasons for us to focus on ASL for 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 going to learn a second [Nakamura (2)]. Further, according to some TV programs and newspaper reports, JSL is recently becoming more popular among Japanese. So we decided to provide a bilingual dictionary for those who wish to learn JSL and ASL.

3. Problems of digital dictionaries

3.1. Problems with spoken language digital dictionaries

Recently many digital dictionaries are available on 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 just viewing an Internet dictionary site.

Almost all of these dictionaries are for the people who can read and write their mother language smoothly and not for those who have some disability in their mother tongue. It is reported that the mother tongue for those who were born deaf is sign language, especially for those born into a Deaf family. The problem for those Deaf children is that it is difficult for them to learn the spoken language for their country. Since their mother tongue is sign language, the spoken language becomes their second language. When they want to learn another foreign language, they have to learn the spoken foreign language first, and then, the second foreign sign language to communicate (Fig. 1).

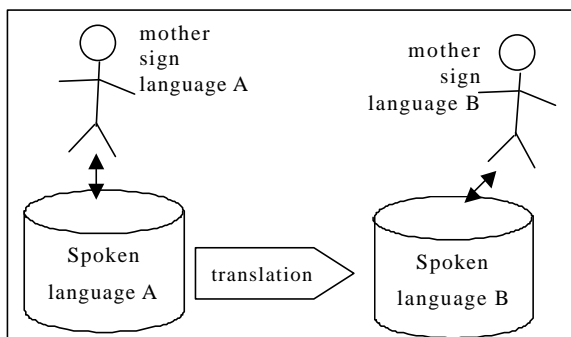


Figure 1. Sign Language Translation Flow

3.2. Course-ware

The authoring system used for developing our dictionary system is called Study-Writer and is widely available in Japanese elementary and junior-high schools. Many course-wares developed by teachers and researchers were utilized in Japanese classrooms. The key feature of this authoring system is that it provides a tool for easily developing teaching materials for educators. Teachers are able to add any instructions or menus to develop students. So teachers can adapt their teaching materials to any level of student by means of such menus or instructions. The most important point of this authoring system is that this software can provide the evaluation for students' grade of attainment, such as worst-scored question or best-scored question, enabling teachers to solve problem areas easily. Many experimental systems are constructed on this course-ware [Yoden & Yamanoi 2000].

4. Purpose of Our Dictionary System

Our goal in making this resource available is to help those who want to learn both JSL and ASL, and to enable them to communicate more easily with others in either country. According to a report from the Deaf students who attended a study abroad tour, the comment that they should have learned ASL beforehand got the largest number of responses [Hashimoto2000].

Our bilingual dictionary system works both on a single computing environment and Internet, within which to view/search through digital video data, making it useful for linguistic research on sign languages and the gestural component of spoken languages. Also this system includes a course-ware application for learning sign languages. It can be used as introduction software for volunteers and Deaf children learning sign language. Also it provides a resource for those who are interested in comparing the two sign languages. Researchers or teachers of the sign languages can find similarities and differences between the two.

5. Dictionary Configuration

5.1. Overview

Fig. 2 shows our dictionary configuration. As you can see, we can search each sign language by either Japanese words or English words. In this way, our system can be described as a quadrilingual dictionary system. Once you choose a word, our dictionary will show you the corresponding Japanese and American Sign Languages.

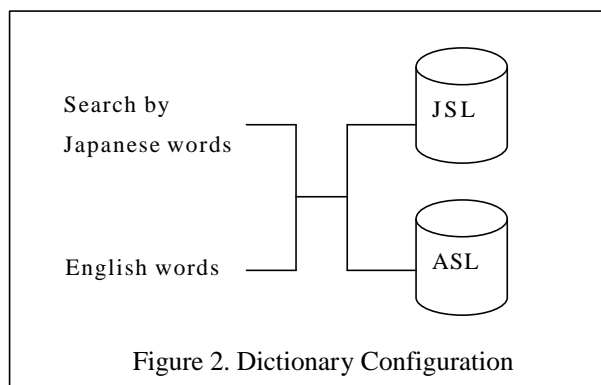


Figure 2. Dictionary Configuration

5.2. Search Flow

When this dictionary system starts up, the menu displays the languages the user can select (Fig. 3). As you



Figure3. System Menu

may see the menu in Figure 3, users can select “Exercise course,” after learning some signs. Upon selection of a language, the first characters of the indices are shown in conventional alphabetical arrangement (Fig. 4).



Figure4. First Characters of Indices in Japanese

For example, if Japanese is selected, the first characters of the indices are arranged in dictionary order (Fig. 5). While using Japanese to search the dictionary, the user can check its both equivalent English word and ASL, in so doing, learn spoken English and ASL simultaneously as shown in Fig. 6.



Figure5. Search Screen using Japanese



Figure 6. Bilingual Sign Language Screen

Users can get back to Japanese indices and also back to English indices just click a button on the display by mouse cursor in Fig. 6. An example of English indices jumped from sign screen is shown in Fig. 7. The resulting screen displays how the screen looks like after a user will click “h” for the search word in ASL, and in Fig.7, you may see that English word is displayed forward to Japanese word.

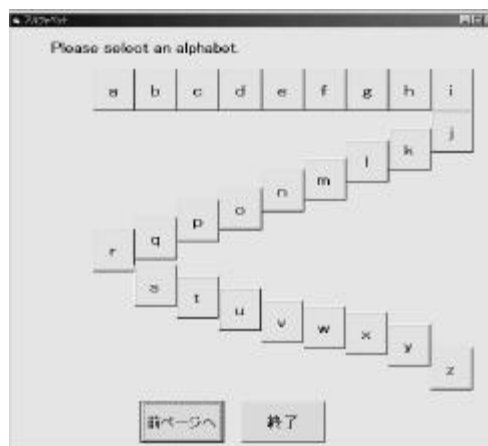


Figure7. Indices of English



Figure 8. Search Screen using English

6. Application

Since our dictionary system is built on course-ware, we can easily expand this system to a CAI system for learning JSL and ASL. Fig. 8 shows an example image when a user opens a Quiz to see if he/she correctly remembers the proper gesture for the word. When he/she answers correctly, then the system replies by sounds and characters such as “Good work!” Even if he/she makes a mistake, the system will respond some kind of message to encourage him/her. Making a mistake means that he/she does not remember that sign and needs to learn it again, which the system will feedback it automatically. In this way, this kind of CAI system provides information about which part of the course is understood by the learner and which part is not.



Figure 9. Exercise Image

7. Conclusion

We have already completed a Japanese Sign Language dictionary with 750 entries, which come from the JSL dictionary for the beginners [Yonaiyama and Ogata 2001]. We are planning to add American Sign Language motion pictures. Cross-reference features in our dictionary present students, sign language learners, and Deaf people alike with a genuine two-language resource that enhances the opportunity of communication skills in both modes.

Course-ware dictionary design and development are still ongoing, however, and we plan to test it and obtain feedback and suggestions. As the first step, we are going to expand it to conversational sentences which will help users to identify a sign and its meaning in the specific context of its use.

8. Reference

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