Designing a Japanese Idiom Education Support System for Overseas' Students

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Abstract

The Japanese idioms are phrases which two or more words combine and have the different meaning from the original word. Therefore, learning a Japanese idiom is difficult for Japanese language learners. We are developing a Japanese Idiom Education Support System for Overseas' Students to solve this problem. The main purposes of the system are to raise learner's interest of learning idiom, and to teach the right usage of an idiom. The main functions of this system are the function of Japanese idiom retrieval and teaching Japanese idiom. The learner can input the idiom into the system and the system can retrieve and display an explanation of the idiom. And the learner can input the situation into the system and the system can retrieve the idiom.

In this paper, the outline of Japanese Idiom Education Support System for Oversea's Students, the method of Japanese idiom retrieval, and the result of questionnaire is presented. A questionnaire did the survey on attitudes toward educational support system.

1 Introduction

Now days, borderless society, borderless economy, and borderless circumstances are progressing on a world-wide scale. The cultural exchanges between each country also prospered. Therefore, the international students who come to Japan continue to increase. From the statistics data of the number of international students, the number of international students who come to Japan increased twice compared to ten years before [1]. The spread of Japanese language education abroad increased also. By 2006, Japanese language learners were 2,980,000 people in 133 nations and areas. This data does not include self learning and using a private tutor. However, since Japanese language learners increased quickly, Japanese language schools are facing a shortage of teachers [2][3].

Also there is another problem of Japanese language learning. Gradually, because of its emphasis on knowledge packing and memorizing, learners have less chances to think by themselves, and learners have less chances to understand Japanese culture; and manners and customs. Therefore, the expectation for the educational support system base on computer is also increased [4][5]. Although the present educational support system is useful for language learning, but various problems still are existing. We point out the main problems as follows.

Because question sentences are prepared, there is no enough flexible communication with learners.

Because learners answer the questions from the multiple choices, they do not take a leading part in answering process. Besides, when the answers given by the learner is wrong, to show the correct answers dynamically on the simple display is difficult. Understanding about Japanese culture; and manners and customs is difficult from the educational support system. To solve the problems mentioned above, we are still researching and developing this system.

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2 The outline of Japanese Idiom

Japanese idiom is a phrase of two or more words combine and have different meaning from the original word. For more explanation see an example shown below.

"鼻が高い(a nose is high)"

1. It means "the nose of a body part being higher than someone", if this phrase is interpreted as the original meaning.
2. When using as an idiom, it means "proudly" or "beam with pride".

Example:

君が司法試験に合格し、お父様もさぞかし〝鼻が高い〟ことでしょう。

1. **Interpretation from the original meaning of the word:**
   Your having passed the national bar exam.
   Probably, your father's nose will be high.
2. **Interpretation from the idiom:**
   Your having passed the national bar exam.
   Your father must be "beaming with pride"
   at your passing

In the case 1, the meaning of a phrase can be interpreted as "nose is high" from the meaning of each word. However, in the case 2, the meaning of a phrase cannot be interpreted from the meaning of each word. The meaning of the example number 2 is the following way of thinking. When someone boasts of something, or while someone is talking exultantly, his face turns upward. At this time, the position of a nose becomes a little high. Expressing that situation, a phrase meaning becomes the meaning of example number 2. The meaning of example number 2 is a similar, such phrases are Japanese idioms.

There are the following Japanese idioms other than "鼻が高い(a nose is high)".

Idiom:
火の車 (Car of fire)
Meaning:
"financial difficulties" , "be strapped for cash".

Idiom:
武士に二言はない
(A samurai does not have duplicity)
Meaning:
I surely keep promise. My word is my bond.

Japanese language has many idioms. There are many various expressions using the body parts, nature, animals, plants, etc. These are often used in Japanese daily conversation. If a learner can use idiom, detailed explanation will become unnecessary at the time of conversation. Detail explanation in conversation becomes unnecessary if learner can use idiom. Furthermore, the contents of the conservation the learner can use the idioms to express their feelings correctly.

English language also has idioms. Some English and Japanese idioms use the same expression. However, the meanings are different.
For example:"pull someone's leg".
In English means "teasing, caper".
In Japanese means "drag down, stand in the way".

A learner can talk with Japanese people smoothly; if he or she can use Japanese idioms.

3 System configuration

This section explains the outline of Designing a Japanese Idiom Education Support System for Overseas Student. Figure 1 shows the system configuration. This system is composed by each module, knowledge base, and database (DB).

There are two types of user input sentence and system output in "learner" part shown in Figure 1. They are "For retrieving idiom" and "For learning idiom". The details of the input sentence are as following.

For retrieving idiom
- ✓ The search word for retrieving idiom. (idiom, situation, a word ,etc.)
- ✓ A conversation sentence with MS Agent.
- ✓ Each operation.

For learning idiom
- ✓ History management of a learner.
- ✓ The answer of an exercise problem.
- ✓ A conversation sentence with MS Agent.
- ✓ Each operation.

The details of the output sentence are as following.

For retrieving idiom
- ✓ Explanation of an idiom.
- ✓ Search assistance for retrieving an idiom.
- ✓ MS Agent's response.

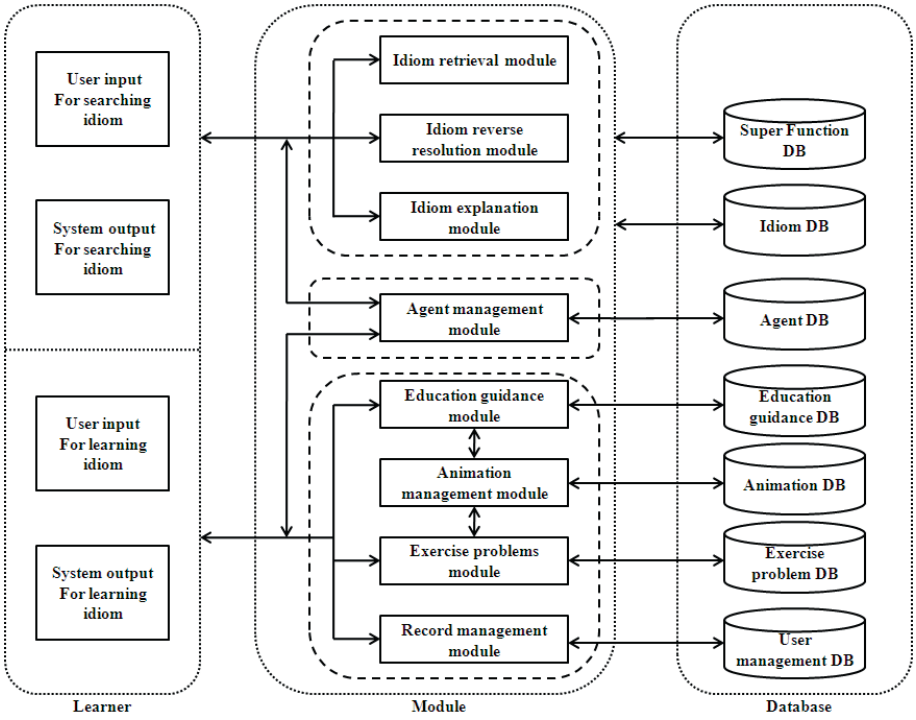


Figure 1. System configuration

For learning idiom

- ✓ Teaching idiom.
- ✓ Exercise problems.
- ✓ Results.
- ✓ Learner's history.
- ✓ MS Agent's response.

This system has basically three functions. They are the function to retrieve an idiom, the function to teach an idiom, and MS Agent. The MS Agent helps learner's operation.

Retrieving an idiom has two ways: The first is by inputting an idiom directly; a learner can also search an idiom by a part of idiom and some words. The second way is reverse resolution of an idiom, a learner inputs a situation then the system searches the suitable idiom. The input sentence is analyzed automatically using Super Function from the field of machine translation. The system displays the meaning, example, similar idiom, situation, and example of use as search results. Moreover, the example of use is shown using the dialogue of MS Agents.

The function to teach idiom explains an idiom using animation, and have an exam. Progress of learning and result of exam are managed as history information. The learning history is displayed by graph. An exercise problem is automatically generated using the frame of the prepared text. Moreover, we generate the example of an idiom, and the response of MS Agent using this way. This system always displays MS Agent and gives explanation of the operation to a learner. MS Agent has easy conversation using an idiom with a learner.

4 Idiom retrieval function

Retrieval of an idiom processes by "Idiom retrieval module" and "Idiom reverse resolution module" as it shown in Figure 1. The outline of Idiom retrieval is as follows. It has two methods.
When learner inputs the idiom, the system displays the explanations.
When the learner inputs the situation, the system displays the idiom corresponding to the input situation.

The example of implementation of Idiom retrieval is shown in the Figure 2. The learner is searching the idiom. The system is presenting an explanation of the idiom which a learner wants to know. And the example of use of the idiom by MS Agent is shown. A learner inputs an idiom in the user input form shown on the right of the Figure 2.

Figure 2. The example of implementation of Idiom retrieval

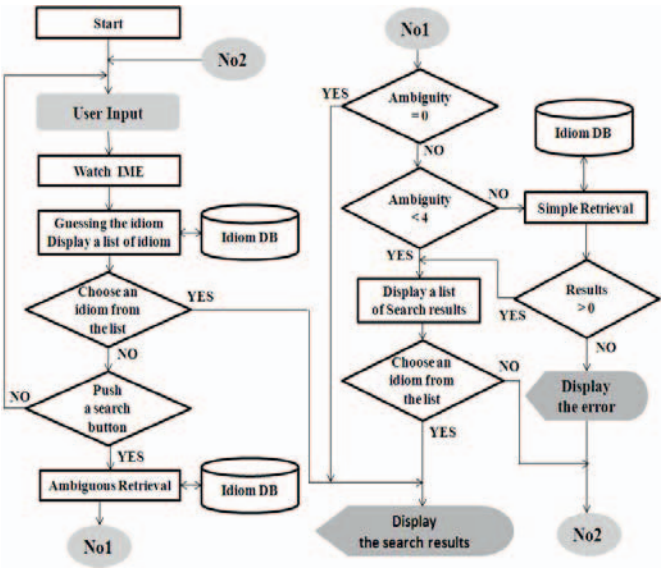


Figure 3. Process of Idiom retrieval module

The system displays a list of an idiom including the word under input. A learner can choose an idiom from a list, and see an explanation of the idiom. Retrieving an idiom uses ambiguous retrieval. The form on the left of the Figure 2 is the explanation of idiom. Two MS Agents explain the example of use of an idiom in the dialogue of MS Agents. Another MS Agent supports the operation of learner and a simple dialogue with a user.

4.1 Retrieving a meaning of idiom

Here, retrieval of the idiom by a learner is explained. A learner can search an idiom using the following ways.

1. Input an idiom directly.
2. Input the word contained in an idiom.
3. The system displays a list of idiom which includes the character under input when a learner inputs the idiom. A learner chooses an idiom from the list.

The process of Idiom retrieval is shown in Fig. 3. A system always checks IME. This is for displaying a list of the idiom which includes the character under input. If a learner chooses an idiom from the list, the system displays explanation of the idiom. Or if a learner clicks a search button, the system performs ambiguous retrieval. This is for preventing the problem which happened when a learner input the mis-spell of the idiom because the system cannot search the correct idiom, etc. If there is an idiom match fully with the inputted idiom then the system displays explanation of the idiom. If there is no idiom match fully with the inputted idiom then the system displays a list of the idiom below ambiguity 4. Simple retrieval is performed if there are no search results of ambiguous retrieval. Simple retrieval retrieves an idiom including an input word, and a system displays a list of the search results. If a learner chooses an idiom from this list then the explanation of the idiom is displayed.

The reason for using these ways are as follows.

- ✓ For preventing the problem which a learner cannot search with an input mistake.
- ✓ For getting a learner interest in other idioms by displaying a list.
- ✓ For retrieval for dimly remembered idioms.

4.2 Retrieving an idiom by a situation

Here is explanation of Idiom reverse resolution module. A learner inputs a situation. The system searches a suitable idiom in the situation. The input sentence is analyzed automatically using Super Function from the field of machine translation.[6] Super Function is concerned with the relation of the original language sentence and the target language sentence. There are two basic structures in Super Function. One is a direction graph, and the other is a transformation table. It is possible to make sentences relating to the direction graph of Super Function in the direction graph, and the

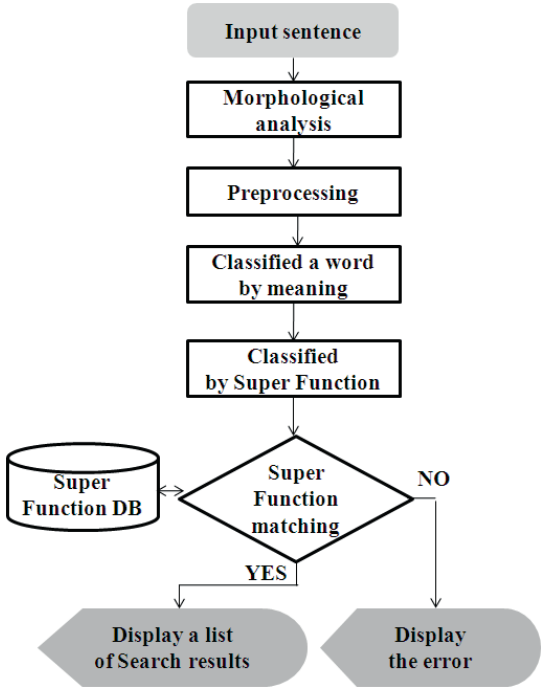


Figure 4. Process of Searching idiom from a situation

transformation table analyzes the input statement. In this research, the source language is the sentences input by learners.

The target language is the source language to which information is added such as idiom, phrase, number of nodes, and variables.

The outline of process of the input sentence analysis by Super Function is shown below. And the process flow is in the Figure 4.

1. The entered sentence is analyzed morphologically.
2. Preprocessing of compound word, and Remove a filler, punctuation mark, particles other than negative form.
3. Classify a word by meaning. Word such as "father" and "mother" are classified into "family".
4. Classify by Super Function.
5. Retrieve Super Function of the same node table in Super Function DB.
6. Idioms are taken out from the edge table of Super Function Database.

The input sentence is analyzed in the above-mentioned process.

Table1. Node table and Edge table

Node Table	Edge Table
Future	Φ 来月
Money	＋ 副収入, 入る
Enjoy	＋ 旅行, する

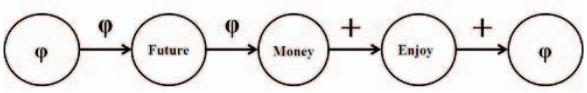


Figure 5. Direction graph

For example:

来月は副収入が入ると思うから、旅行をします。

(I guess I will probably get extra money next month. So I will go to travel.).

The processing step1:

Analyzes morphologically the input sentence using chasen[7].

The processing step 2:

Remove a filler, punctuation mark, particles other than negative form. The input sentence is changed into 来月/副収入/入る/思う/旅行/する.

The processing step 3:

Classify a word by meaning. A noun is classified according to a meaning. A verb is classified according to +, -, and 0. It is classified according to this example as follows.

来月(next month) ⇒ future
副収入(extra money) ⇒ money
入る(get) ⇒ ＋
思う(I think) ⇒ 0
旅行(travel) ⇒ enjoy
する(do) ⇒ ＋

The processing step 4:

In this research, the sentence structure made from the classification of Step 3 is Super Function. Figure 5 shows the direction graph. Table 1 is node table and edge table of Figure 5.

The processing step 5:

Retrieve the same Super Function in the Super Function DB according to the generated node table. Process moves to the processing step 5 if agreed.

Figure 5. The an example of implementation which teaches the idiom using animation

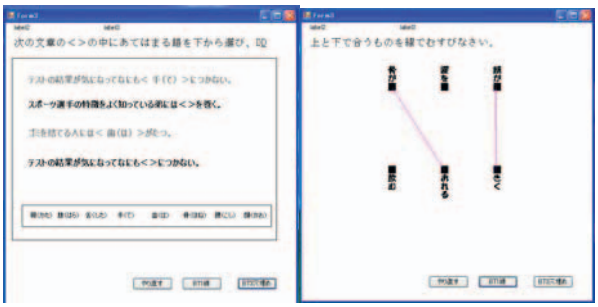


Figure 6. The exercise problem form

The processing step 6:

An idiom corresponding to Super Function is taken out from the edge table of Super Function Database. The system displays a list of an idiom.

The system can use the edge table and node table of Super Function Database when generating an exercise problem sentence. Input sentence analysis and exercise problem generation can be easily performed by one database and methodology. In this research, Super Function is used for such a reason. Moreover, when classifying into a Super Function at Step 4, a word is also registered into an edge table as shown in the Table 1. And the node table and edge table which were created from the user input sentence are saved. Because we collect learner's input sentences and then we can analyze a learner's input sentence.

Furthermore, we can register these into Super Function Database and we can extend the super function DB. This can be used for a future system improvement.

However, there is some problem in the method using Super Function. The problems of the input sentence analysis which used Super Function are as follows: The system cannot respond to the input sentence of Super Function which does not exist in Super Function Database. And the combination of a node and the combination of a node and edge increase by the long text. Consequently, the number of Super Function also increases. Super Function Database needs enough number of Super Function for the input sentence analysis. The system cannot respond to a long sentence now. In order to solve these problems, we need the improvement of the methodology of Super Function. Or we need to add the methodology which is different in the methodology of Super Function.

5 Teaching idiom function

The teaching idiom function is explained here. The function to teach an idiom processes by "Education guidance module", "Animation management module", "Exercise problems module", and "Record management module" as you can see from the Figure 1. This function has the following methods.

- ✓ To explain a Japanese idiom
- ✓ The exercise problem of an Japanese idiom
- ✓ Generation of a exercise problem
- ✓ User management

5.1 To explain a Japanese idiom

The function to teach idiom explains an idiom using animation. Animation is needed in order to give a learner interest. The result of a questionnaire survey shows this necessity. A questionnaire result is shown by Chapter 6. Figure 5 is an example of implementation which teaches the idiom using animation. The system explains a Japanese idiom using TVML [8]. TVML Player is used for the display of animation. TVML is a text-based language that can describe all the necessary elements for TV program productions. TVML Player is the software that can interpret the script written in TVML and generate a TV program in real time. It is easy to create animation using this software.

TVML can also simplify modification of animation.

5.2 The exercise problem of an Japanese idiom

The methods of answering the problems in Japanese exercise are as follow:

1. Select the right answer from the given choices
2. A part of sentence is blank. The learner can select the right word to fill a blank.
3. Connect a line which divide a sentence, and make the right sentence.
4. Learner inputs an answer.

A system adjusts the difficulty of an exercise problem to a learner's level. The system manages a result of exercise problem as history information. A system creates these exercise problem sentences automatically. The creation of the exercise problem uses Idiom DB and the Super Function DB. A part of exercise problem is shown in the Figure 6. The Figure 6 is the exercise problem form of part 2 and 3 above.

6 The development of the questionnaire system

We have conducted a survey on attitudes toward educational support system. The part of questionnaire results and considerations are shown here below:

Purpose of survey:

In order to develop the system, we need to get to know a request from learners. Moreover, we also need to get to know the comments toward an educational support system.

It is very important to send out questionnaires, and to get to know the opinions from the Japanese language learners.

The Questionnaire way:

Object: The first year students and second year students of Japanese language department, Beijing University of Posts and Telecommunications in China. The students are studying Japanese for one to two years.

The number of students: 44

The number of samples: 42

There is two "no comment".

The results of questionnaire:

1. Do you need Japanese language educational support system?

In the questionnaire result of this question, eighty-one percent answered "Necessary" or "A little necessary ". The answer of "Unnecessary" was 0. Therefore, developing the Japanese language educational support system is needed.

Answers	No. of Learners	Percentage
Necessary	18	43%
A little necessary	16	38%
Not applicable	8	19%
A little unnecessary	0	0%
Unnecessary	0	0%
Total of number	42	100%

2. What do you think about educational support systems?

Only thirty-six percent thought that educational support system is interesting. As a reason which is not interesting, there were many opinions "The contents are simple" and "The system does not use animations and music". The system needs to use many animations and musics. Otherwise, a system cannot raise learner's interest of learning.

Answers	No. of Learners	Percentage
Not interesting	5	12%
A little uninteresting	9	21%
Not applicable	13	31%
A little interesting	12	29%
Interesting	3	7%
Total of number	42	100%

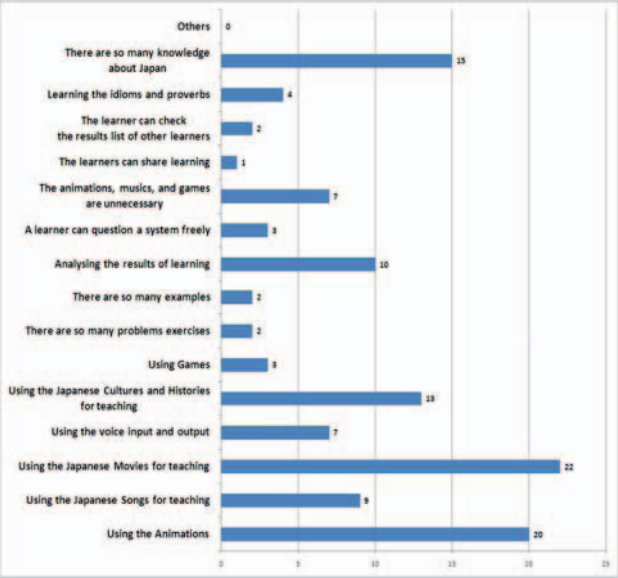
3. What do you often use, when learning Japanese?

Eighty-two percent use the dictionary and the electronic dictionary for learning Japanese. The system needs to have the function which is like the dictionary. The learners can continue using the system and searching Japanese words which want to know.

Answers	No. of Learners	Percentage
Dictionary	22	58%
Electronic dictionary	9	24%
Personal computer	2	5%
Reference book	5	13%
Others	0	0%
Total of number	38	100%

4. What kind of teaching methods do you want? The students can choose three answers from the given choices in this question.

Thirty-five percent of answers are "Using the Animations" and "Using the Japanese Movies for teaching". The animation is indispensable to a system. Twenty-four percent of answers are "Using Japanese Cultures and Histories" and "There are so many knowledge about Japan". From these results, the system needs to teach an idiom using animation and much knowledge about Japan.



From these results of questionnaire, we got to know the students hope the interesting educational support system. Especially, the system has to use the animations for teaching. Moreover, the system needs to have the function of a dictionary. It becomes the system convenient for a learner.

7 Conclusions

In this paper, we described about Designing a Japanese Idiom Education Support System. We referred to learner input sentence analysis using Super Function, and the method of retrieving the idioms. At the present stage the effectiveness of Super Function in this system has not yet verified enough. In order to verify the validity of a system, we need to expand the Super Function Database and we need to expand the contents of animation which use for teaching idioms. Therefore, future work is to research the method of automatic generation of a database and the method of automatic generation of animation contents. And we referred to the learner's request from the results of questionnaire. We got to know the system needs animation and a dictionary function from the results of questionnaire. The system has the animation using TVML. In order to display the explanation in another language in the future, we need to create the bilingual dictionary.

Acknowledgements

This work was supported in part by the National Science Foundation of China under grant No. 60873001, 2007BAH05B02-04, and 2007BAH05B02-04.

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