# Design of Terminological Dictionary System for Japanese Software Outsourcing Document Translation

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***Abstract:*** *The term is exact and reflects the essential characteristics of the concept. The electronic term dictionary system of outsourcing document translation with Japanese software not only provides accurate information, but also has the advantages of compact, lightweight, convenient to carry and quick reference, which significantly reduces the workload of translators. Based on the ideas and methods of software engineering, this paper designs a glossary system for software outsourcing document translation to Japan. Firstly, this paper designs the framework structure, integrates Struts, Spring and Hibernate to build a new framework, and reduces the coupling between the presentation layer, business logic layer and persistence layer. Secondly, this paper designs the database. On the basis of the conceptual structure design, the logical structure design of the database management system based on SQLServer is carried out. Finally, this paper designs the search function, including basic search, classification search, advanced search and recommendation search, to provide more timely and accurate information support and knowledge services for translators.*

## 1. Introduction

The dictionary of terms provides direct evidence for the dictionary "communicative theory". According to the knowledge of lexicography and terminology, lexicography is the compilation of terms in order [1]. In the dictionary field, "instrumental theory" has always been dominant, and with the rise of systemic functional linguistics, "discourse theory" has been respected, but both of them are coders centered and focus on one-way compilation process. The actual process of spreading and sharing knowledge and information in lexicography should be regarded as a communication system between editors and users. Printed dictionary editors and users can communicate indirectly through paper materials, while electronic dictionaries can communicate directly. Editors and users can communicate and discuss related issues directly through the network, which is not only conducive to the accuracy of use, but also conducive to the richness of content. A term is a word or phrase used in a professional field. The term is exact and accurately reflects the essential characteristics of the concept, without reminding people of vague concepts. Many Japanese software outsourcing document translation information is not properly conveyed, which is easy to cause misunderstanding between developers and users. The use of glossary to carry out translation work can improve the accuracy of translation.

## 2. Frame Structure Design

The famous software master Ralph Johnson defines Framework as follows: A framework is a reusable design of an entire system or part of a system, consisting of a set of abstract classes and the way their instances interact with each other. Frameworks generally have plug-and-play reusability, mature stability, and good teamwork. The complex multi-layer structure of J2EE determines that large-scale J2EE projects need to use frameworks and design patterns to control software quality. At present, there are some commercial and open source application frameworks based on J2EE in the market, among which the mainstream framework technologies are: Struts framework based on MVC pattern, Spring framework based on IoC pattern and Hibernate object/relational mapping framework. SSH framework is a new framework integrating Struts, Spring and Hibernate, which can reduce the

coupling between the presentation layer, business logic layer and persistence layer, avoid unnecessary low-level design and development work, and improve the opening efficiency of information system and later update and maintenance work [2]. The SSH framework structure is shown in Figure 1.
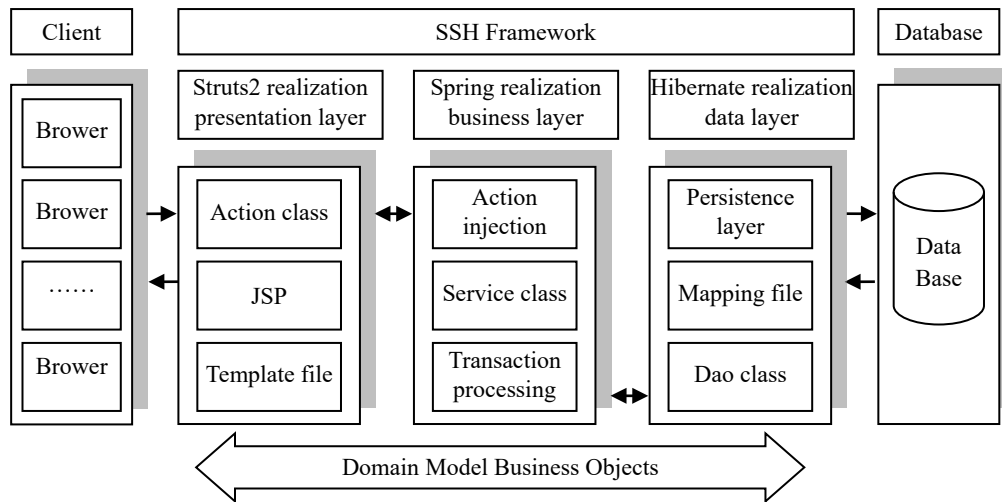


*Figure 1: SSH framework structure*

### 2.1 Struts

Struts is a widely used lightweight web framework, the main technology is Servlet and JSP, the Web layer development provides a simple solution, through the web.xml file configuration filter, through the struts.xml file configuration client page request jump. In the continuous improvement of the version, the software design pattern is clear, the program is written in a clear hierarchy, and the user request is encapsulated with the concept of Action, which reflects the programming-oriented idea more strongly.

### 2.2 Spring

Spring is a model of lightweight development framework, which is mainly responsible for organizing the cooperative work of various business logic modules. It successfully simplifies the complexity of enterprise applications with AOP programming ideas, and tries to use injection to program interfaces rather than classes [3]. The use of IOC technology can remove the excessive coupling between programs, decoupling products to the greatest extent, and reducing the difficulty of using Java EE API. AOP ideas reduce code duplication and promote solution effectiveness.

### 2.3 Hibernate

Hibernate is an object/relational database mapping tool for Java environment. It is located between the program and the database in the software system and provides a completely object-oriented database operation. The framework can directly adopt the encapsulation strategy without writing its own code. Hibernate OGM is a data persistence layer framework that can seamlessly connect with non-relational data, and program development can easily use relational data and non-relational database.

## 3. Database Design

Database design is the technology of establishing database and its application system, and it is an important content of software design. Specifically, database design refers to the construction of the optimal database pattern for a given application environment, the establishment of the database and its application system, so that it can effectively store data and meet the application needs of various users. At each stage of database design, compatibility between database and computer software design should be ensured [4]. In the actual design process, it is necessary to strengthen the analysis of user needs, pay

attention to the selection of design methods, do a good job in physical design and verification design, properly reserve free field space, strengthen the connection between various tables, and pay attention to the collaborative design of database and software programs [5].

### 3.1 Conceptual Structure Design

Conceptual structure design mainly includes two aspects: conceptual pattern design and transaction design. The task of transaction design is to examine the database operation tasks proposed in the requirements analysis stage and form a high-level description of database transactions. The task of conceptual schema design is to build conceptual database schema using advanced data model based on the data items identified in the requirements analysis stage and the information of future changes in the application field. The goal of conceptual database schema design is to accurately describe the information schema of the application field, support various applications of users, and be easy to convert into logical database schema and easy for users to understand.

Japanese software outsourcing document translation glossary system, by "Vocabulary information, Part-of-speech identification, Document category" and "Belong, Correspond" correspond two "one-to-many" connections, the conceptual structure design results are shown in Figure 2.

### 3.2 Logical Structure Design

Logical structure design is to convert the conceptual model completed in the conceptual structure design stage into a data model that can be supported by the selected database management system, mainly converting the E-R model into a relational model. It is necessary to specify the global logical structure of the database that is reorganized after the original data is decomposed and merged, including the key words and components determined, the record structure and file structure re-determined, and the relationship between the established files to form the database administrator view. Based on SQLServer database management system development, using SQLServer data type, according to the rules of SQLServer database design.
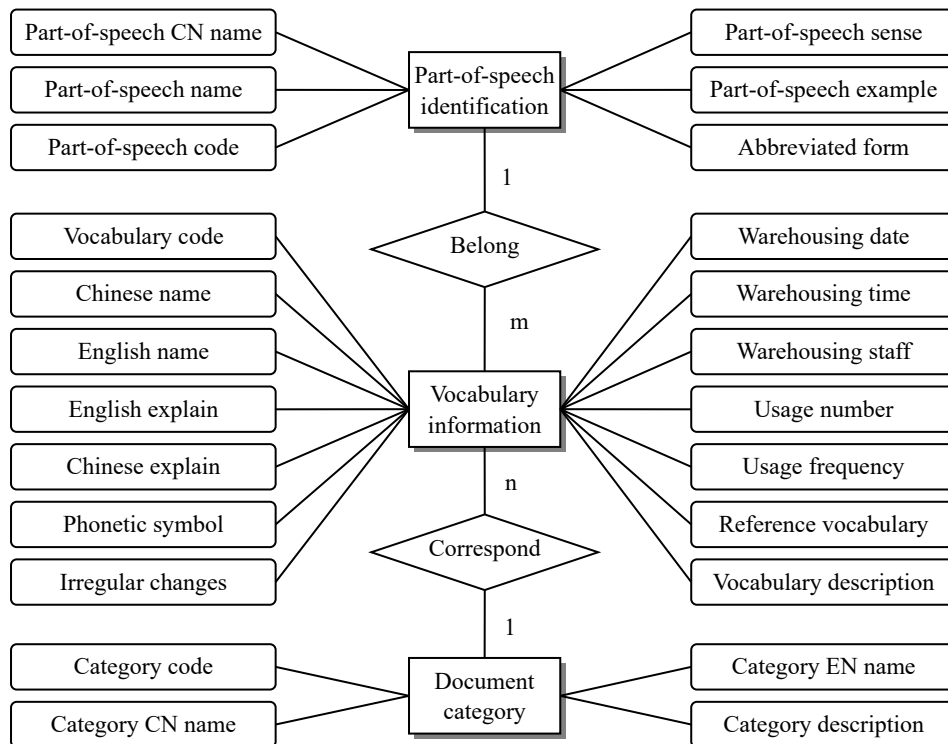


*Figure 2: Database conceptual structure of terminological dictionary system for Japanese software outsourcing document translation*

(1) "Vocabulary information" Table. "Vocabulary information" entity is converted to "Vocabulary information" table. The primary keyword is "VocaCode", and the attribute includes, in addition to the attribute of the "Vocabulary information" entity, the primary key associated with its two "one-to-many".

The results of logical structure design are shown in Table 1.

*Table 1: "Vocabulary information" table*

| No | Fields | Type | Byte | Null | Field description |
|----|--------|------|------|------|-------------------|
| 1 | VocaCode | char | 10 | NO | Vocabulary code |
| 2 | VocaCNname | varchar | 20 | NO | Chinese name |
| 3 | VocaENname | varchar | 50 | NO | English name |
| 4 | VocaENexplain | varchar | 500 | NO | English explain |
| 5 | VocaCNexplain | varchar | 500 | NO | Chinese explain |
| 6 | VocaSymbol | varchar | 100 | NO | Phonetic symbol |
| 7 | VocaDate | datatime | 8 | NO | Warehousing date |
| 8 | VocaTime | datatime | 8 | NO | Warehousing time |
| 9 | VocaStaff | varchar | 30 | YES | Warehousing staff |
| 10 | VocaNumber | int | 4 | YES | Usage number |
| 11 | VocaFrequency | decimal | 5 | YES | Usage frequency |
| 12 | VocaChanges | varchar | 50 | YES | Irregular changes |
| 13 | VocaReference | varchar | 50 | YES | Reference vocabulary |
| 14 | SpeechCode | char | 2 | NO | Part-of-speech code |
| 15 | CategoryCode | char | 2 | NO | Category code |
| 16 | VocaDescription | varchar | 1000 | YES | Vocabulary description |

(2) Conversion of "Part-of-speech identification" Table. "Part-of-speech identification" entity to "Part-of-speech identification" table. The main keyword is "SpeechCode". The logical structure design results are shown in Table 2.

*Table 2: "Part-of-speech identification" table*

| No | Fields | Type | Byte | Null | Field description |
|----|--------|------|------|------|-------------------|
| 1 | SpeechCode | char | 2 | NO | Part-of-speech code |
| 2 | SpeechName | varchar | 30 | NO | Part-of-speech name |
| 3 | SpeechCNname | varchar | 10 | NO | Part-of-speech CNname |
| 4 | SpeechForm | varchar | 10 | YES | Abbreviated form |
| 5 | SpeechExample | varchar | 200 | YES | Part-of-speech example |
| 6 | SpeechSense | varchar | 200 | YES | Part-of-speech sense |

(3) The Document category" Document category" Table. "Document category" entity is converted to "Document Category "table, and the main keyword is "Category code". The results of logical structure design are shown in Table 3.

*Table 3: "Document category" table*

| No | Fields | Type | Byte | Null | Field description |
|----|--------|------|------|------|-------------------|
| 1 | CategoryCode | char | 2 | NO | Category code |
| 2 | CategoryCNname | varchar | 100 | NO | Category CN name |
| 3 | CategoryENname | varchar | 100 | NO | Category EN name |
| 4 | CategoryDescription | varchar | 1000 | YES | Category Description |

## 4. Search Function Design

Terms are the crystallization of human wisdom and knowledge, and contain abundant information. The task of bilingual term automatic extraction has long attracted extensive attention from academia and industry [6]. Search is the most important function of the Japanese software outsourcing document translation glossary system, which provides more timely and accurate information support and knowledge services [7]. Because the core of building a dictionary of translation terms is to provide services for translation, when a dictionary of terms is used in machine translation, the system automatically searches the dictionary. When a human translator uses a term dictionary, the system provides various search functions according to actual needs, as shown in Figure 3.
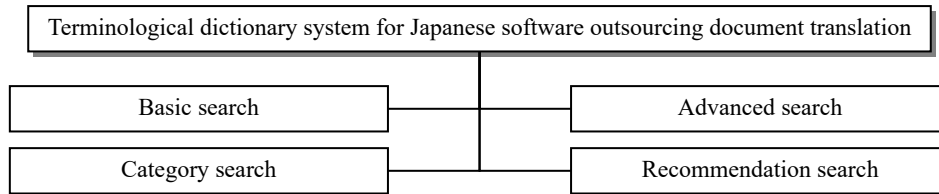
| Terminological dictionary system for Japanese software outsourcing document translation | |
| --- | --- |
| Basic search | Advanced search |
| Category search | Recommendation search |

*Figure 3: Search function of terminological dictionary system for Japanese software outsourcing document translation*

### 4.1 Basic Search

Basic search is similar to the search function of Google's home page, which implements full-text search functions in Chinese and Japanese. Enter the search request in the input box of the basic search page, click the search button, you can get detailed bilingual terms. Basic search can well support the search of Chinese and Japanese, when the search request is entered, the system automatically queries the matching term terms, and quickly displays the search results. At the same time, an example function is provided to illustrate the detailed usage of the term to the user [8].

### 4.2 Category Search

Basic search searches all terms in the term dictionary. When there are many terms, the search speed is slow. Often in the software development process, there is a clear division of labor in writing documentation. Requirements analysis documents are handled by system analysts, system design documents are handled by designers, software testing documents are handled by testers, and software maintenance documents are handled by maintenance personnel. The system provides classification search function, which can narrow the search scope and improve the search efficiency and accuracy.

### 4.3 Advanced Search

Both basic search and categorical search are single-condition searches, that is, enter a search term. In the actual process of software outsourcing document translation to Japan, multi-condition retrieval is needed. Advanced search can realize complex multi-condition combination logic search, in the advanced search page, through the "+ or -" button "to add or delete" search conditions, the relationship between search conditions can be set through the logical drop-down box, including "and, or and do not include" and other three logical operators. By setting the weights, users can accurately describe the focus of the search.

### 4.4 Recommendation Search

Recommended search uses data mining technology to calculate the correlation between Query and the content of each term, and outputs terms that do not contain Query text, but the content of the term is closely related to Query. This is an implicit search that does not require user manual intervention and is automatically completed along with the above three search methods. For example, after entering "database design" in the search interface and clicking the search button, the search results page not only displays the corresponding translation of "database design", but also recommends related terms that may be of interest to users. It includes the corresponding translation of "database conceptual structure design, database logical structure design, database physical structure design, database security design, database index design". If the user is interested, they can click on the related term link to open the specific content page.

## 5. Conclusions

In order to complete the translation of outsourced documents to Japanese software, translators often need to consult a lot of materials, especially the use of paper dictionaries is time-consuming and labor-intensive. The electronic term dictionary system of outsourcing document translation with Japanese software not only provides accurate information, but also has the advantages of compact, lightweight, convenient to carry, quick reference, which significantly reduces the workload of

translators.

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