Subject World: A System for Visualizing OPAC

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Requirements for subject retrieval in OPAC have recently expanded. Librarians had created tools such as subject catalogs and classified catalogs to search documents based on their contents. However, most users are unaware of the existence of the catalogs, or do not know how to use them. In addition, there are few available OPAC systems from which the user can retrieve these catalogs. In this paper, we propose a system that visualizes heterogeneous terminology including catalogs, enabling users to operate them for subject retrieval in OPAC. We will also describe a prototype system called ``Subject World'', in which the user can browse and operate BSH4 subject headings and NDC9 index terms, and search by subject headings from Osaka City University's OPAC.

Subject World: OPAC

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OPAC

OPAC   OPAC
BSH4   NDC9
OPAC   Subject World

1. Introduction

Requirements for subject retrieval in OPAC have recently expanded. Librarians had created tools such as subject catalogs and classified catalogs to search documents based on their contents before the age of the computer. Nowadays, though, the user can search documents by inputting terms into OPAC. However, most users are unaware of the existence of the catalogs, or do not know how to use them. In addition, there are few available OPAC systems from which the user can retrieve these catalogs.

We propose a system that visualizes heterogeneous terminology including catalogs, enabling users to operate them for subject retrieval in OPAC. The system helps users to: (1) retrieve OPAC by showing related terms; (2) reorganize retrieved information by enabling users to operate displayed objects; and (3) understand subject catalogs and classified catalogs in OPAC.

We have developed a prototype system called ``Subject World'' in which the user can browse and operate BSH4 (Basic Subject Headings) subject headings and NDC9 (Nippon Decimal Classification) index terms and retrieve information from Osaka City University's OPAC (hereafter OCU-OPAC).

In this paper, we describe the overview of the Subject World.

2. Subject World

Subject World is a prototype system in which the user can browse and operate BSH4 subject headings and NDC9 index terms, and retrieve information from OCU-OPAC.

The system database is constructed of "objects" that the user can operate, and "links" that have semantics between objects. There are two kinds of objects: "concepts" and "documents." Currently the system deals with Japanese books contained in OPAC as documents. There are two kinds of links: the semantics between concepts, and links between concepts and documents.

We have implemented two methods for integrating heterogeneous terminology.

Figure 1 shows the framework of integrating heterogeneous terminology.
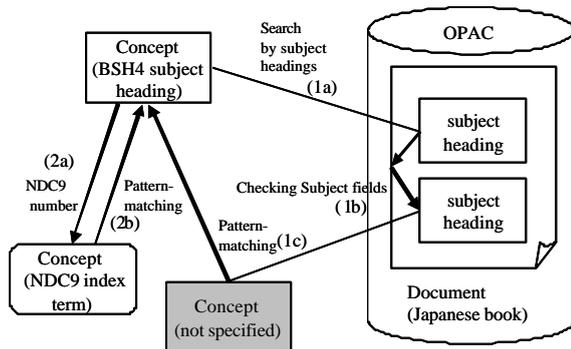
Figure 1: Framework of integrating heterogeneous terminology.

(1) between BSH4 and other subject headings via OPAC
(1a) from concepts (BSH4 subject headings) to documents in OPAC by "search by subject headings" function in OPAC
(1b) from documents in OPAC to other subject headings by checking subject fields in OPAC
(1c) from subject headings in OPAC to concepts (BSH4 subject headings) by pattern-matching the labels
(2) between BSH4 subject headings and NDC9 index terms
(2a) from concepts (BSH4 subject headings) to concepts (NDC9 index terms) by using NDC9 index numbers contained in BSH4 subject headings
(2b) from concepts (NDC9 index terms) to concepts (BSH4 subject headings) by pattern-matching the labels
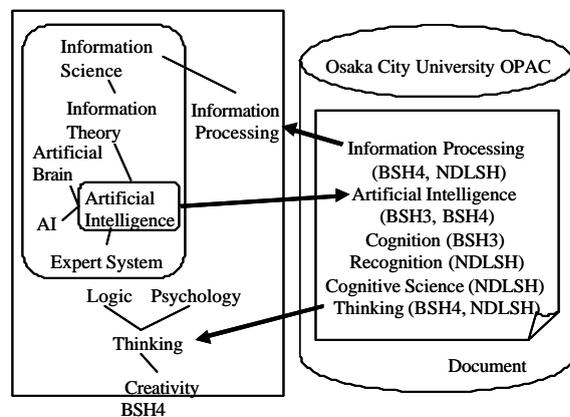
2.1 Example

We present an example of the integrating method (1). Figure 2 shows a BSH4 subject heading "   (Artificial Intelligence)" in BSH4 subject catalogs [1].

	(Artificial Intelligence)
007.1	007.13 (NDC9 index number)
UF	(Artificial Brain).
TT	(Information Science) 121
BT	(Information Theory)
NT	(Expert System)

Figure 2: BSH4 subject heading "   (Artificial Intelligence)"

Subject headings that are linked directly from the BSH4 subject heading "
(Artificial Intelligence)" are UFs (Use For) "
(Artificial Brain)" and "   ", a TT (Top Term) "   (Information Science)", a BT (Broader Term) "   (Information Theory)", and a NT (Narrower Term) "
(Expert System)."

Figure 3: Overview of example 1.

Although it is difficult to search subject headings that are not linked each other in BSH4 database, Subject World can link subject headings including BSH4, BSH3, and NDLSH (National Diet Library Subject Headings) that are not linked directly in the BSH4 database by connecting to OPAC.

Figure 3 shows an overview of the example and a screen example is shown in Figure 4.

When a user selects a concept object " (Artificial Intelligence)" and executes "search BSH4 subject headings" in a main window, subject headings such as " (Artificial Brain)" " " " (Information Theory)" " (Expert System)," are displayed as concept objects. When the user selects the object and executes "search by subject headings" in OPAC, the system connects to OPAC, and retrieves documents (Japanese books) that have subject headings " (Artificial Intelligence)," and displays search results in a "search results" window. When the user selects a document, an

icon representing the document object is displayed in the main window. One document has subject headings " (Artificial Intelligence)" (contained in BSH4 and BSH3), " (Information Processing)" (BSH4 and NDLSH), " (Thinking)"(BSH4 and NDLSH), " (Recognition)"(NDLSH), " (Cognitive Science)" (NDLSH), " (Cognition)" (BSH3). When the user selects the document object and executes "search BSH4 subject headings," these are displayed as concept objects. In addition, the user can search BSH4 subject headings " (Information Processing)" and " (Thinking)." Furthermore, the user can search a BT " (Information Science)" via " (Information Processing)," and BTs " (Logic)" and " (Psychology)" and an NT " (Creativity)" via " (Thinking)."

2.2 Investigation

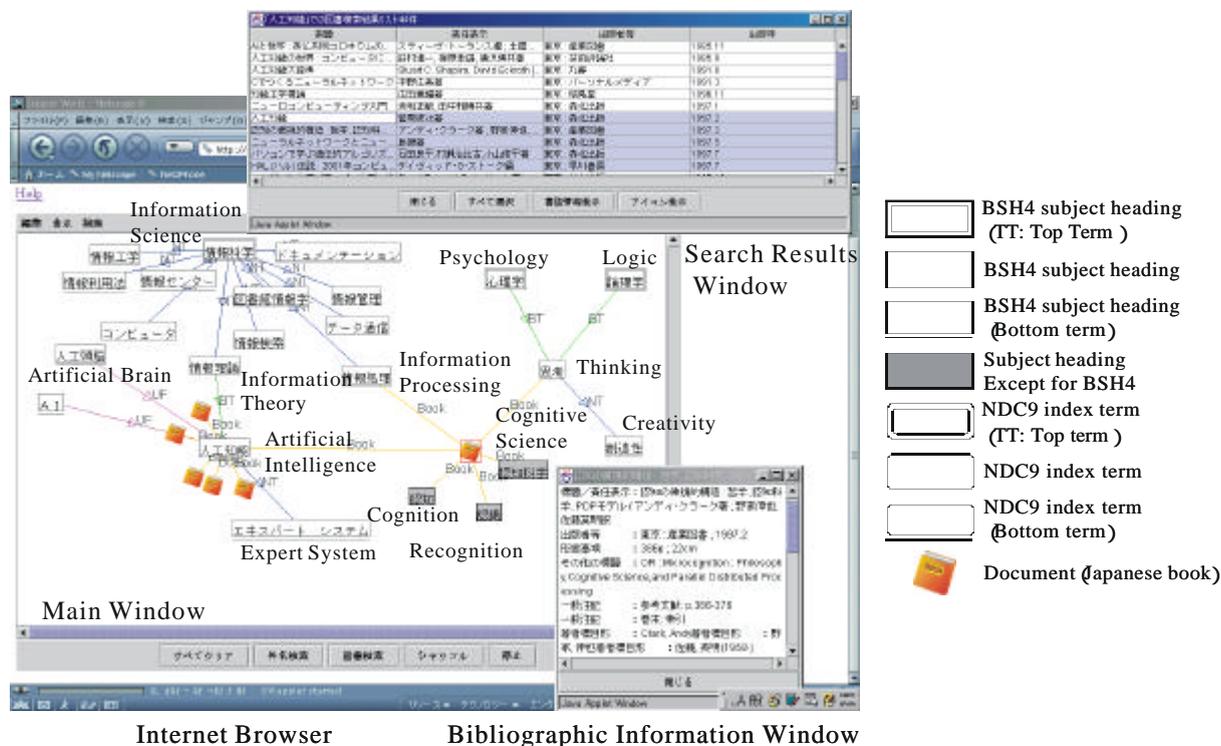We make Subject World open to the public

Figure 4: Screen example of example 1.

from the authors web site [2] and perform preliminary experiments.

We describe an investigation about displaying BSH4 subject headings and searching subject headings in OCU-OPAC.

BSH4 subject headings except for SN (Scope Note) and SA (See Also) were successfully displayed.

As of May 2001, in OCU-OPAC, 101,969 Japanese books have more than 2 subject headings from a total of 359,479 Japanese books (28%)[1]. Likewise, 91,035 foreign books contain more than 2 subject headings from a total of 291,255 foreign books (31%). In a sense, the probability of displaying other subject headings by selecting a document is 28% in Japanese books and 31% in foreign books.

3. Related Work

In the library world, Kita had proposed an idea of integrating subject catalogs and classified catalogs for subject retrieval, however, the idea was not implemented [3]. Currently in some systems such as the National Diet Library Web-OPAC [4] and Watanabe's BSH-OPAC [5], subject retrieval using BSH4 and NDC9 is available. Subject World is different from them in that it can display the relationship between heterogeneous terms, and the user can operate them.

In the field of Computer and Information Science, there is much research concerning integration and visualization of concepts. We think that the significance of our research is (1) that new findings can be brought about concerning how to deal with real data in the library world, and (2) that Subject World is the first prototype for visualizing BSH4 subject headings and NDC9 index terms.

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[1] The subject headings contained in the OCU-OPAC are mainly imported from other cataloging databases such as NACSIS-CAT.

4. Summary

We have proposed a system that visualizes heterogeneous terminology including catalogs, enabling users to operate them for subject retrieval in OPAC. A prototype system called Subject World in which the user can browse and operate BSH4 subject headings and NDC9 index terms, and retrieve information from OCU-OPAC was described. We think that the significance of our research is (1) that new findings can be brought about concerning how to deal with real data in the library world, and (2) that Subject World is the first prototype for visualizing BSH4 subject headings and NDC9 index terms.

We need to improve the user-interface and add functions, and perform a user-study to optimize Subject World.

References

[1] B.S.H. Basic Subject Headings 4th edition, the Committee on Subject Headings of the Japan Library Association, 1999.

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[4] National Diet Library Web-Opac, http://webopac2.ndl.go.jp/

[5] Watanabe, T.: BSH niyoru OPAC no Shudai kensaku (Subject retrieval of OPAC by using BSH), H9 NACSIS seminar research report, pp. 33-134, 1998.