Abstract

Open Course Ware (OCW) is continuing to spread among the universities in the world. Each university offers various courses at every section, but it is not easy to grasp the entire detail of whole information. If all lists of courses of the university were looked at one time, the list could be become enormous. Users have to take a time to find from these courses. With the search function which is used with the system of general OCW, its users must input matching word exactly same of web’s courseware subject or statements of contents. There is a problem. This limits users’ choice is the problem. iOCW solves this.

iOCW system delivers new method of searching courseware information with expansion of users’ association. If users’ curious is imputed, related and recommended OCW’s course subjects will be suggested. Its’ Users can easily find curious subjects with iOCW. Because other subjects that have never been considered by users are suggested by the system, this motivates users to explore unexpected conscious subjects.

Introduction

Since OCW had been started in 2011 at MIT, the number of universities that provide OCW has been increasing day by day. Kyoto University started it’s own OCW in 2005, and the number of courses grew to be more than 1085 now. Thus the contents of each university are enormous, and it goes without saying that it’s tough work to find preferable courses from world’s OCW. Though OCW is intended to gain the user’s motivation toward the courses of each university, the user would be at the loss to choose from such a huge volume of information. This is a problem that must be solved to construct huge resources opened to everybody.

There are cross-language or cross-source search services like OCW Consortium’s search engine [1] or JOCW contents search system [2]. Each of them enables the users to search courses from given universities by inputting preferable keywords to show the results. However, beginners or people who are not accustomed to the language might be confused, because they are needed to input correct terms to describe the course. Many providers of OCW are facing the same problem that how to lead the beginners. Some of them prepare special contents or lectures to introduce their own OCW to general people [3]. But many of OCW search services are not able to correspond to these special contents. Considering these points, brand-new way of OCW course search system is required to gain general user’s motivation. We propose such a new search system named IOCW that enables general users to easily search curious courses from world’s OCW.

IOCW uses an inspirational way that is provided by i.Plot system as mentioned below section. Inspirational search is entirely different from contemporary searches in the point that they are not connecting one to one straightly. The user’s input words are analyzed and associatively related words are inspired by the system, and in turn the next words are
dragged. Thus the users can search further the input words by inspirational search system. This makes the process enjoyable, inviting, productive and interactive. Its intuitive operation can deliver new type of communication. This system is applied for cross-cultural communication.

It may affects culture of study for each student. With this advanced searching system, culture of study might be changeable. A list of course that is used be ordered by each department could be another one integrated list. That list could be more accessible and its own shape. This may change the style of learning and culture of studies. This system gives diversity for each OCW systems. This diversity turns into each culture of universities. We may found difference between Asian culture and other's one inside IOCW system implement for each university all over the world.

**“i.Plot” : Inspiration Plot**

The core engine of this search system is called “i.Plot”. It enables visualization of potential associations through word association. In this system, words form inspiration space that describes the intersections of them and they are displayed interactively on the screen. Because the relationships of words are categorized based on the human’s thought forms, the associative method of searching reflects human thought processes.

Fig.1 shows examples of Thought forms. They are consisted of 5 patterns. 1. Concatenation. Same source group is arranged in order of continuity. For example “Hop, step and jump”. 2. Balance. It is the three-sets that we use frequently. Like “Head, body, foots”. 3. Division. Divide one idea into two child-like ideas. For example a computer could be divided into software and hardware. 4. Unification. The pattern of combining two ideas into a new idea. Like a radio and cassette turn into Cassette Radio. 5. Crisscross. Four ideas are derived from a central idea. Like “North, South, West, East”

Fig.1 Details of thought forms

“i.Plot” has databases of more than 29,700 words, 9,937,500 cached relations between these words. The relations are generated by thesaurus data from several thesaurus dictionaries and experimentally collected data in demonstrating “i.Plot”.

The brief flow of “i.Plot” is described below.

1. The user inputs arbitrary phrase into the system, with HTTP request.
2. The input words are analyzed and divided into words.
3. Then the system searches cached connection between analyzed words. Each connection is weighted in the distance between words.
4. The system use chaos engine to determine which connections to select so that the result become more dynamic.
5. Finally, connected nodes and edges are returned.

**System Overview**

In this system, each one’s curious OCW courses are suggested with easy inputting words with interactions. The suggestion is
enabled with algorigm of IOCW and related databases.

Main database of IOCW is constructed by the element of each OCW subjects’ meaning. And also including i.Plot system equips thesaurus and category databases.

A. Flow of Search

Specific function of IOCW is matching associative word with course-tag database. That makes IOCW suggest OCW courses subject related with users’ entered words in the input field. IOCW is extension of the system made by i.Plot that Naoko Tosa has designed. Generating associative words of i.Plot, it looks like a drawer of the spreading ecosystem Details are as follow and Fig.2.

Fig.2 IOCW Search Flow

B. Databases

IOCW equips course-tag database besides embedded i.Plot system’s databases. In this database includes many courseware’s associative course-tags, weight, course subject and URL. Fig.3 shows the data structure.

- Course-tags are the sets of associative words for each courseware’s contents.
- Weight parameter is determined for each course-tag. Heaviest one means relevant tag to the subject of that course.
- Course subject and its URL are also tagged with each course-tags

Embedded i.Plot system has another word category and Thesaurus databases.

C. Interface

Interface is constructed using FLASH. That makes user friendly. There is a form that the user can input. And three buttons (Inspiration, select and clear) are ready. It is shown as Fig.4. If user inputs words (two or more words are recommended) and pushes the Inspiration button, the associative words related with inputted ones are spreads on the screen as in Fig.5. And the related subject of OCW is presented automatically as shows in Fig.6.

Fig.3 IOCW Database Structure

Fig.4 Interface detail

Fig.5 Example of spread of words
D. Algorithm
Algorithm is shown as in Fig.7. Further descriptions offered below.

- Users enter interested own curious words into input field.
- Associated words are generated by i.Plot system.
- If user Select from associative word, the tag that matched with associative word from course-tag database is searched from that one.
- Each course-tag tags’ weights are calculated and the heaviest ones’ subject is indicated on the screen.
- When course-tag tags do not match, another associated word are searched in entering Roget Thesaurus database. With this result, one’s course subject is determined. And then, course information is indicated on the screen.

E. Use of select button.
Pushing select button on the top of the screen, range search function is available. In this function, words on the screen are selectable by user. Selected word could be inputted into the system as inputting inputted form on the top of the screen, using this function, alternative associative words are indicated by the i.Plot system. And another course title of OCW is suggested. Repeating use of this function, users can deepen its own interest with fun.

Clarify common sense of it’s own
We are using database that is made by Japanese person for this iOCW(i.Plot) system. So, this system’s associative search result is supposed to be effected by Japanese (Asian) people’s common sense or culture.
If Non-Japanese (Asian) make another databases for iOCW(i.Plot), it might be different output(association) is made from now ready iOCW. From the difference, we could learn the common and the difference between the two. So, there is a potential to clarify its own common sense in iOCW. In this way, Asian based common sense might be observed.

Future Work
iOCW offers search service using the associative retrieval function of i.Plot. Students can search various lecture materials by inputting keyword that is associated with keywords collected from OCW system in his organization or other OCW all over the world. Moreover, optimal lecture note suitable for each user could also be searched in combination with the below-mentioned “portfolio management function.”

e-Portfolio[5] management function
A student can create an individual portfolio from the contents of the OCW of an organization to which he/she belongs as
well as those contained in OCW system all over the world. iOCW calculates optimal combination of lectures for each user by using his/her lecture selection pattern stored in the portfolio and proposes relevant lectures to him/her. The user can choose the lecture materials suitable for himself/herself from the lectures that were searched or recommended and can add them to his/her portfolio. Also a portfolio which is created by other user can be copied and also be considered as his/her favorite lectures. Moreover the system can analyze the portfolio which an user has created and use it as a database of a proposal function.

Self-study self-learning support function
A student learns from OCW as well as from the actual lectures in accordance with the contents of the portfolio created by iOCW. In that case, using inspiration-based search, other lessons can be searched based on association search and can also be learned from the portfolio he/she created. In addition, the system has "mini-note" function that can automatically summarize lesson contents and that can provide a function of “self-study” and “self-learning.” Using the mini-note function, an user can learn the summary the contents of a lesson, and can deepen his/her own understanding.

References

Related Web sites
Kyoto University OCW ocw.kyoto-u.ac.jp