The Catalogue Browsing Access Paradigm

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Abstract

Catalogue browsing is a well known activity in the library world. We are all familiar with the box of cards that is used by the librarian who browsed it over in order to find the card for the book we were searching for. The Catalogue Browsing Access Paradigm (CBAP) that is suggested in this report[1] aims at providing the users with the same feeling of the actual catalogue browsing activity while using the benefits of the digital world.

1. THE CATALOGUE BROWSING PROJECT

Catalogue browsing is a well known activity in the library world. Browsing the box of cards the librarian finds the card for the book being searched for. This card contains the information that characterizes the specific book e.g., the name of the book, the name of the authors, the publisher name, the year of publication, and most important its physical location.

This work[1] focuses on one of the interaction paradigms named the Catalogue Browsing Access Paradigm (CBAP). CBAP is a non-conventional access paradigm for digital libraries (DLs) that may be effectively used in DLs to meet more sophisticated (and often neglected) user needs, going beyond traditional query-based interfaces [3]. The concept of this paradigm is to provide the users with the same feeling of the actual catalogue browsing activity while tapping into the benefits of the digital world. The relationships between the physical and the digital realms are of interest.

As a basic requirement, an online catalogue should support the primary functions of a card catalogue: finding and collocation functions [8]. The online catalogue can help to better identify library entities "in terms of their nature, scope and orientation through different data fields such as intellectual level, document type, genre, language code, geographic area code and additional notes" [4]. The design of online catalogues should explore the new possibilities offered by technology to better match emerging needs and requirements of online behavior. In fact it has been argued before that online catalogues are still hard to use because they often are designed without sufficient understanding of searching behavior [2]. An assessment of the effectiveness of online catalogue design should not be based on its success in matching queries but rather by its success in answering questions. All these processes may help to disambiguate or take into account the context of a user's information need, thus enabling her/him to find appropriate answers to a need and acquire a better understanding of knowledge structures in a certain domain. It should also be pointed out that the design of online catalogue systems has often failed to consider the social collaborative dimension of searching behavior that can be easily observed in physical libraries. An online catalogue system should provide assistance to the searcher where necessary, and follow the idea that bibliographic records serve as information "seeds" to fertilize subsequent searching [5].

The main goal of the CBAP prototype development project is to provide a seamless interaction between the physical and the digital realms in accessing library artefacts based on the concept of CBAP. The development process adopts an integration of agile principles [1] and the user-centred design methodology [7]. The interface that is developed is a speech-based mobile interface to a DL. Beyond the search activity, two additional features were defined. The first feature is enabling vocal commands for artefact searching and localization. The second feature is enabling artefact localization in the physical library using a digital positioning system. Speech input is enabled for navigating the application, and speech output is enabled for the positioning instructions. It was noted that nowadays libraries involve several kinds of artefacts like DVDs, audio and video CDs, etc. This note is significant when analyzed using the library and catalogue metaphor since as perceived by the users, the traditional setting of the library includes mainly books.

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[1] This report is based on our work that was accepted to IASTED-HCI, 2007. Further details about the project implementation can be found there.

The first release of CBAP was performed by two developers during 4 months (from the middle of May till the beginning of September 2006) and was composed of four iterations. Customer collaboration and evaluation by users were emphasized during the process. Measures were taken to control the progress.

The implementation of the CBAP prototype is performed using the Opera 8.5 browser[2] (W3C® compliant) that supports VoiceXML and XHTML for Microsoft Windows XP systems. In addition, it provides a small screen view that enables the development for mobile applications. Figure 1 presents CBAP screenshots of the Guided Search interface (1a), Search Result interface (1b) and the Book Localization interface (1c).

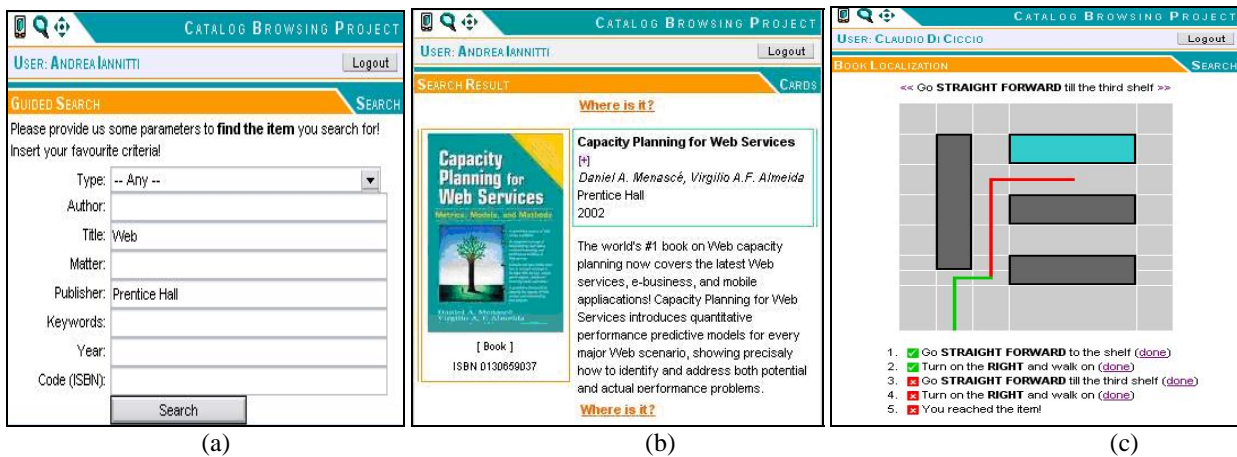|		
(a)	(b)	(c)

Figure 1. Screenshots from the CBAP prototype

2. EVALUATING THE SPEECH ASPECT OF CBAP

The evaluation process of CBAP is composed of evaluation iterations that each examines the artefacts of the previous development iteration and results in design changes for the current or next development iteration. The 1st development iteration provides its artefacts. During the 2nd development iteration, the 1st evaluation iteration took place to evaluate and reflect on the artefacts produced in the 1st development iteration and further to decide upon changes that should be introduced. During the 3rd development iteration, the 2nd evaluation iteration took place to evaluate and reflect on the artefacts produced in the 2nd development iteration, and so on. Each iteration is of 3-5 weeks and as aforementioned CBAP first release was composed of 4 such iterations. Following this process of combining the agility concepts with on-going user evaluation that contributes to the design and is performed by the team members, we join the call for the HCI community that is made recently by Norman [6] to embrace rapid and iterative methods and be part of the team for the sake of continuous HCI design.

In the first two iterations the user groups were identified to include librarians and readers, and questionnaires and semi-structured interviews were prepared in order to better understand user needs. In the third iteration a cooperative evaluation was performed with two users in order to learn about users' behaviour with the system and encounter major problems. After the forth iteration ended, meaning the first release was over, we planned and conducted a controlled experiment for the purpose of the evaluation of the speech aspect.

We conducted a within experiment with six participants who are computer science students in different levels, 3 male and 3 female. The experiment task includes login to the system, search activities and book localization activity. The task can be performed using speech (S) or without speech (non-S). Each of the participants performed the task in both modes S and non-S, while 3 participants follow S and then non-S and 3 follow non-S and then S. Further, before starting the experiment, each participant filled an attitude questionnaire and received ten-minute training on how to use CBAP. After the experiment each of the participants filled a questionnaire to reflect on his/her activities. In what follows, we focus on one of the outcomes.

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[2] See http://www.opera.com/ about the Opera browser.

An automatic time measure, which was developed as part of the system, provides us with the time stamps of the login / logout and with the time stamps of each search start /end. Table 1 presents the averaged time in minutes that was invested on the two search activities by both experiment groups together with its division per mode.

Table 1. Averaged search time (in minutes)

Group	Averaged search duration	Averaged Non-S search duration	Averaged S search duration
Non-S → S	54.66	28	81.33
S → Non-S	26.58	14	39.16

As can be observed, the S→Non-S group performed the entire task almost twice faster than the Non-S→S group. When looking into the data of speech and non-speech per each group, we see that the participants in both groups performed the speech task slower then the non-speech task. This implies that although the speech task required more time from the participants, they learned better the system when first using it with the speech option.

3. SUMMARY

In this work we report on developing a prototype to demonstrate the catalogue browsing concept. With this respect, we found that users accept this access paradigm in a natural manner as if they used to browse over a catalogue. They enjoy giving vocal instructions to the system and receiving vocal localization guidance from the system. Still, they expect the system to understand as much as possible natural language utterances and be more sensitive to languages and pronunciation.

Referring to the methodologies used, the user evaluation is fostered by the process agility and the product development benefits from keeping the design updated according to the evaluation outcomes. In addition, a set of evaluation tools including automated features is built and refined during the process and can be further used.

4. ACKNOWLEDGEMENTS

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