Trails of Experiences: Navigating Personal Memories

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ABSTRACT

Systems to augment personal information aim to support people in remembering both past experiences and specific information associated with past experiences. These types of information go beyond those supported in systems for Personal Information Management, making it necessary to develop new user interface and interaction techniques. Our approach is based on characteristics of human memory. Its major contribution is the combination of a graph-based data model with navigation mechanisms based on various types of context and on associations.

Categories and Subject Descriptors

H.3.3 [**Information Storage and Retrieval**]: Information Search and Retrieval; H.5.2 [**Information Interfaces and Presentation**]: Miscellaneous

General Terms

Human Factors

Keywords

Autobiographical Memory, Personal Information Management, Context-Awareness

1. INTRODUCTION

Software systems to augment personal memory aim to support people in remembering past experiences – both general autobiographical information and specific details about past experiences. General autobiographical information is, e. g., "In which year did I go to CHINZ in Hamilton?". A specific detail is "Which book was recommended to me when I spoke to someone about hypertext at a conference in Auckland?".

Our hypothesis is that it is beneficial to take into account characteristics of human memory. We have previously described aspects of the conceptual design of such a system [5, 6]. To test our hypothesis, we developed the Digital Parrot system that provides context-based and associative navigation for memory items in a graph-based data model.

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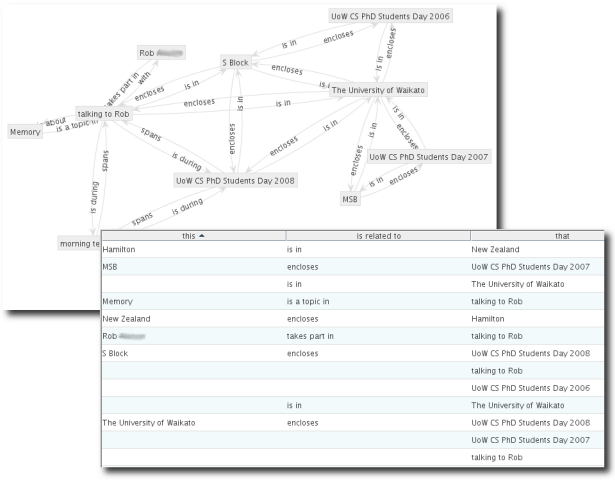

Figure 1. Main view: graph (back) vs list (front).

2. THE DIGITAL PARROT

The Digital Parrot is a repository of memories composed of information items. We place the emphasis on the retrieval aspects, both in this paper and in our implementation.

The main view displays information items in either a graph or a list (see Figure 1). Part of our ongoing evaluation is to determine the most beneficial type of main view. The Digital Parrot's data model is graph-based: information items form subject–predicate–object statements. The object of a statement can in turn be the subject of other statements. The graph view directly shows this structure, while the list view shows individual statements.

3. NAVIGATION

Navigation tools in the Digital Parrot affect the information shown in the main view, either through *restricting* or through *highlighting*. By restricting the view, navigation components request that some information items be hidden from the main view. Only those information items are shown in the main view that are not hidden by any active navigation component. Highlighted information items are shown more

prominently in the user interface. An information item is highlighted when at least one active navigation component requests it to be. When the user deactivates a previously active navigation component, all its restricting and highlighting requests are removed from the main view. They are restored when the navigation component is re-activated.

3.1 Contextual Navigation

In the current version of the Digital Parrot, contextual navigation is provided for location, time and graph structure. Future versions may include further types of context, such as people participating in an experience.

Navigation based on location and time. Users can navigate through their stored experiences based on the location of experiences and of other information items. A map navigator shows all information items for which geospatial data is available. We are currently working on extending this to also include information items without geospatial data that are known to be located within an information item that does have geospatial data. The map navigator can both restrict and highlight. While it is active, only those information items are visible in the main view that have no associated geospatial data, and those whose geospatial data places them within the boundaries of the map at the current zoom level. Information items annotated with geospatial data are shown on the map. Selecting information items on the map highlights them in the main view.

Time-based navigation directly mirrors location-based navigation, with a timeline playing the role of the map and timestamps that of geospatial data.

Navigation based on graph structure. The Digital Parrot's data model is graph-based. Users can take advantage of this structure to navigate among information items. In the graph view, this type of navigation is direct and intuitive. In the list view, two user interface components enable similar navigation. Users can order all statements in the list by subject, by predicate or by object, making it easy to locate all statements sharing, e. g., the same subject. And whenever a user selects an information item in the list view, all its other occurrences are outlined. This enables the user to find, e. g., for the object of a given statement all those statements that use this information item as their subject.

3.2 Associative Exploration

Associative exploration allows users to build trails of statements, restricting the main view to the information items on the trail and their direct neighbours. Trails let users focus on a narrow portion of their information items. The trail is visualised in the user interface, allowing for easy backtracking by removing the most recently added trail element. This allows the user to take into account the types of information items in the trail: To answer a question such as "Which book was recommended to me when I spoke to someone about hypertext at a conference in Auckland?", a user could start a trail at the information item "Auckland". The user could then add to the trail the type *Conference* and then the type *Conversation* to restrict the main view to conversations that are connected to conferences that are connected to Auckland.

3.3 Search

In addition to contextual navigation and associative exploration, the Digital Parrot also allows textual search. Information items that match the query are highlighted. The current version of the system supports only textual information items. An appropriate equivalent might have to be found if the Digital Parrot is extended to other datatypes.

4. DISCUSSION

We introduced the Digital Parrot, our system for augmenting personal memory that allows users to explore and retrieve their memories by means of contextual association-based navigation. It is intended to be run on a desktop computer and focuses on retrieval. It thus offers a subset of the functionality of a full augmented personal memory system [5]. We intend to use it to evaluate our hypothesis.

Components of the Digital Parrot's user interface mirror those found in other programs. Several systems enable their users to navigate information by context: documents by time [4]; documents by time and location [3]; photographs by time, location and participants [2]. Feldspar [1] is an associative query front-end to Google desktop search. However, all these systems are generic Personal Information Management systems and deal with information types that are different from personal memories.

5. REFERENCES

[1] Chau, D. H., Myers, B., and Faulring, A. 2008. Feldspar: A system for finding information by association. In Proceedings of the CHI 2008 Workshop on Personal Information Management (Florence, Italy, April 05–06, 2008). PIM 2008.

[2] Elsweiler, D., Ruthven, I., and Jones, C. 2007. Towards memory supporting personal information management tools. J. Am. Soc. Inf. Sci. Technol. 58, 7 (May. 2007), 924–946. DOI= http://dx.doi.org/10.1002/asi.v58:7

[3] Gemmell, J., Bell, G., and Lueder, R. 2006. MyLifeBits: a personal database for everything. Commun. ACM 49, 1 (Jan. 2006), 88–95.
DOI= http://doi.acm.org/10.1145/1107458.1107460

[4] Krishnan, A. and Jones, S. 2005. TimeSpace: activity-based temporal visualisation of personal information spaces. Personal Ubiquitous Comput. 9, 1 (Jan. 2005), 46–65.
DOI= http://dx.doi.org/10.1007/s00779-004-0291-x

[5] Schweer, A. and Hinze, A. 2007. Challenges in interface and interaction design for context-aware augmented memory systems. In Proceedings of the 7th ACM SIGCHI New Zealand Chapter's international Conference on Computer-Human interaction: Design Centered HCI (Hamilton, New Zealand, July 02–04, 2007). CHINZ '07, vol. 254. ACM, New York, NY, 55–58.
DOI= http://doi.acm.org/10.1145/1278960.1278968

[6] Schweer, A. and Hinze, A. 2007. The Digital Parrot: Combining context-awareness and semantics to augment memory. In Proceedings of the 2007 British HCI International Conference Workshop on Supporting Human Memory with Interactive Systems (Lancaster, UK, Sept. 04, 2007). MeMos 2007.