

BrainDump: An Interface for Visual Information-Gathering during Web Browsing Sessions

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ABSTRACT

In this paper a software prototype called *BrainDump* is described. The approach is focusing on information gathering during web browsing sessions. While performing such a task, the structure and amount of needed data is not known in advance. The system provides the functionality to create and manipulate visual images of mental connections in a dynamic way. Therefore only one single step of interaction is needed. Furthermore the user can follow links back to the source of information, annotate content and hierarchically group collected items.

Categories and Subject Descriptors

H.5.2. [Information interfaces and presentation]: User Interfaces – Graphical user interfaces (GUI)

General Terms

Documentation, Design, Experimentation.

Keywords

Graphical User Interface, Visual Information-Gathering, Visual Sensemaking, Personal Web Information System.

1. INTRODUCTION

The BrainDump prototype [2] is focusing on information-gathering tasks. These are complex web information tasks whereby the user has more than one question in mind. Users executing this kind of task are called knowledge workers and are defined as people “whose paid work involves significant time: gathering, finding, analyzing, creating, producing or archiving information” [9]. This creative business work faces a continuous change between analysis and synthesis. This interdependent process has been coined *reflection-in-action* [p.21, 8]. The amount of needed data, as well as their structure, is not known in advance. A given task is highly dynamic and structured stepwise. In contrast current tools imply that the goal of a task is clearly specified in advance and the steps to the solution are previously known [6]. Thus the interaction is predefined by the systems constraints. As consequence these tools hinder the user’s creative

process in its early phase. The BrainDump prototype is addressing these problems. Knowledge workers are enabled to use a highly flexible visual map to represent and refine their current comprehension of a task. Considerable research has shown how users organize information using their spatial memory [4, 5, 6]. Spatial layouts are often used to manage transient or temporary information. BrainDump utilizes a metaphor based on fluids and cell structure, derived from experiments with natural physical substances [3]. This kind of visualization allows the user to visually memorize anticipations about relations. Furthermore textual annotations can be used. A first user study indicates that participants understood the purpose of BrainDump completely [2]. All of them would like to use the application more often in their daily work. They especially appreciated the easy way to visually change relations and associations between information.

We argue that resuming an interrupted task or continuing an earlier finished research is highly accelerated by utilizing BrainDump. The concept of the prototype aims towards offering the user a high degree of recognition for collected elements.

The development of the prototype is based on initial requirements:

- Task based interaction: “People should learn the task, not the technology” [7].
- Providing an overview: flexible visual shaping of the structure of the resulting ideas, associations and mental concepts should be supported.
- Modifying the overview: while being created it should be possible to directly modify the overview and thus supporting the reflection-in-action process.
- Flexible (re-)structuring of information
- History: the creative process should be saved for later reuse and reflection.

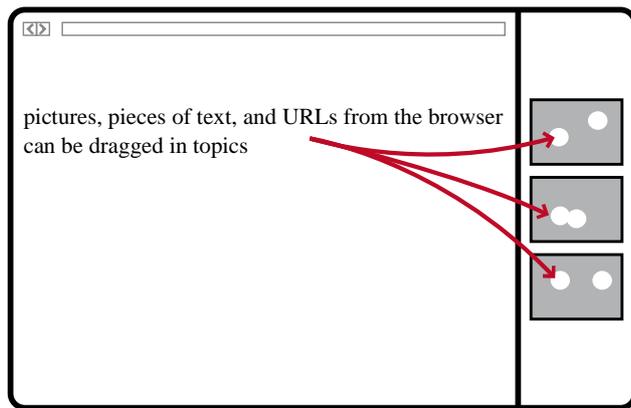
Specific design decisions for BrainDump were derived from the requirements above [2]:

- manual visual definition of relations with optional textual description
- definable strength of relations between objects
- free spatial sorting and arranging of objects
- hierarchical structuring of items with topics
- automatic saving of item related search queries
- manually collected representations of websites, according to interesting content for the user (e.g., pictures, text, videos)
- making annotations to the collection

- local saving of websites related to collected items to prevent the loss of outdated websites
- local saving of links (URLs) referring to the respective website

2. THE BRAINDUMP INTERFACE

The BrainDump interface appears at the right side of the screen like an extended taskbar (see Figure 1, A). It shows links referring to topics existing in the user's collection. The user can drag and drop parts from any document in the browser (pictures, pieces of text, and URLs) on these links. While hovering over the links these are magnified for a better view (see Figure 1, C). Now the user is able to freely place and relate the respective item.



A



B



C

Figure 1: The BrainDump Interface at the right side of the browser. A: Concept of collecting B: Marking items C: Dragging the item into the system and relating it [2]

An alternate view in BrainDump is the *Management Mode*. It offers a full screen overview of the user's collection (see Figure 2). In this mode collected items and created topics can be managed. Furthermore the links referring to topics at the right side can be managed.

In BrainDump topics and collected items can be grouped hierarchically. Figure 3 shows an example: topics are colored and items have a white background. In Figure 3A a view of a green topic is shown. It contains three items and the blue *topic 1* in it. Figure 3B offers a zoomed-in view on the blue *topic 1* with no items and *topic 2*. Figure 3C shows the zoomed-in view on the chartreuse *topic 2* containing two items.

To zoom in on a chosen topic while being in *Management Mode* the user performs a double click on it. By doing so an interactive ring on the left side of the screen appears (see Figure 3B). More rings appear if the user navigates deeper into the hierarchy (see Figure 3C). These rings also enable zooming out of a topic again and thus navigating up in the hierarchy. In addition, these rings are offering an overview about the level of hierarchy where the current view is located. Backtracking can be done step by step up the hierarchy or by directly jumping to a topic. All transitions are animated to support user orientation.

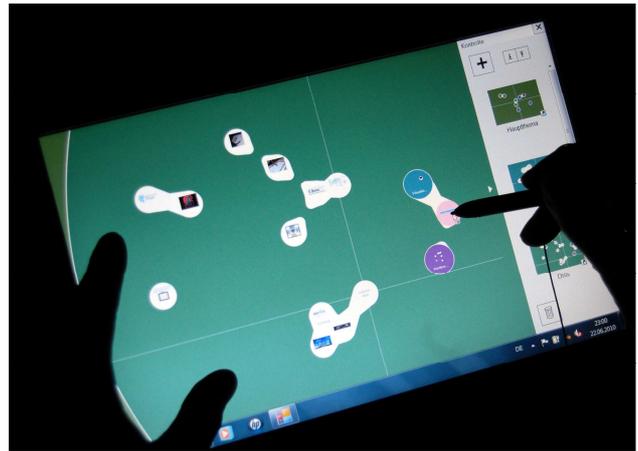


Figure 2: Management Mode of BrainDump for managing items and topics [2]

3. IMPLEMENTATION

The prototype is a windows application running on Windows XP and higher versions. It is based on the .NET-Framework and uses Object Linking and Embedding (OLE) for embedding and linking to documents and other objects. BrainDump can be used in combination with Microsoft Internet Explorer 7 or higher. The collected data is stored in an XML-file. The Zoomable User Interface was realized by using the Piccolo.NET framework [1]. Further details on the algorithm and concept are described in the publication *An Interface for Visual Information-Gathering During Web Browsing Sessions: BrainDump – A Versatile Visual Workspace for Memorizing and Organizing Information* [2].

4. CONCLUSION AND FUTURE WORK

The next step will be to evaluate the use of the system for a period of approximately two weeks and compare it with existing tools. An advanced follow-up version of the prototype for multi-touch interaction is currently under implementation on a tablet-pc. To gain first insights for design and improvement of the interactive visualization on multi-touch devices we conducted some further experiments described in the publication *Immersive Data Grasping Using the eExplore Table* [3].

5. ACKNOWLEDGMENTS

This project (contract no. 080951799) is funded by the European Social Fond and the Free State of Saxony as well as SAP Research.

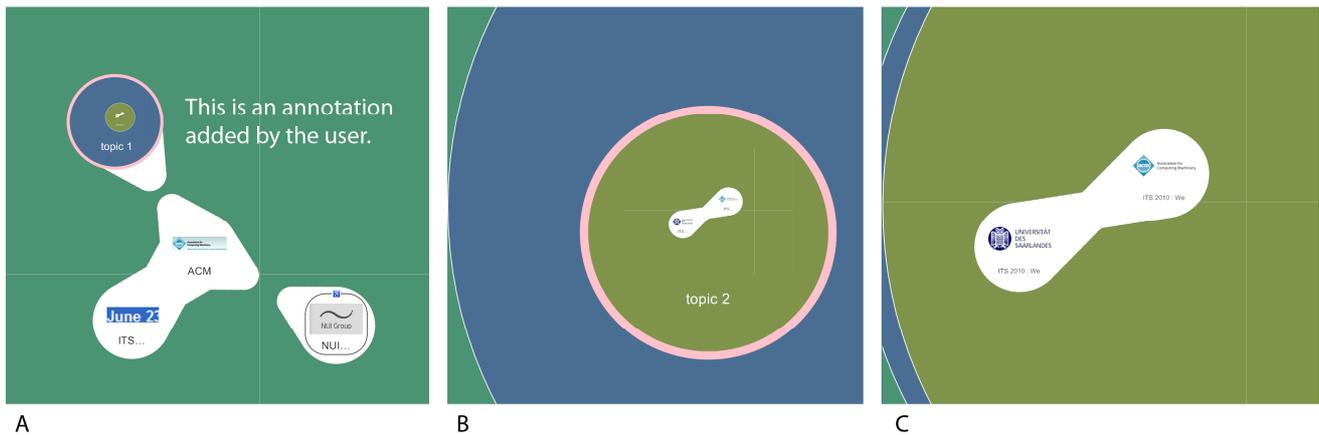


Figure 3: BrainDump interface with hierarchically grouped topics (colored) and items (white). A: View of a green topic with three items and the blue topic 1 in it. B: Zoomed-in view on the blue topic 1 with no items and topic 2. C: Zoomed-in view on the chartreuse topic 2 with two items. The rings on the left side of the screens B and C can be clicked to zoom-out and get up the hierarchy again. [2]

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