History Deck: A Web Browser History Visualization Inspired by Storytelling

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Abstract

Browser history supports users reflecting upon their past, proceeding in decision making and revisiting web pages seen before while browsing the Web. However current implementations fail to provide a proficient solution for the users' need. An approach for improving the visualization of the browser history is described in this paper by drawing an analogy between hypertext and storytelling. Therefore criteria for structuring of the visualization and characteristics of comic art as a genre of graphical story-telling can be applied. Since the user is considered as the narrator of the story, through his actions performed while browsing, the history is constructed automatically next to the context of his current work. The concept was implemented as a browser add-on named History Deck.

1 Introduction

Browser history supports the users' memory finding visited pages by providing a consistent image of the past. Nevertheless, only 0.2 percent of all page requests originate from browser history (Oberndorf 2007). As an approach for an improvement, the analogy of storytelling and characteristics of comic art are introduced to apply sufficient structure and visualization. According to the well accepted theorist Genette (Genette 1998), events of the story (historie) are ordered sequentially by the author called plot (discours). The narrative itself becomes real through reproduction by the narrator called narrative act or presentation. In hypertext an event is equal to the visit of a web page. While surfing through the netted hypertext (story) the user arranges pages into sequential order (plot). He represents the narrative instance. The users' interaction is captured and rendered by the browser history. As the perceptual instance it is performing the narrative act by rules covered in the following. Reflections of the narra-tive instance only become visible through interaction. Subsequent interpretation is straight-forward, since the user embodies both narrator and reader. As a genre of narrative visualiza-tions comic art adds visual characteristics. Each page visit can be visualized within a panel. Adding them into sequences over time makes narration of complex stories possible.

2   Designing History Deck

Figure 1 gives a foresight to the concept visualization as browser add-on named History Deck. The history is implemented as a sidebar, which is divided in sections for present (Figure 1, a) and past (Figure 1, b). In the following chapter design decisions for History Deck are described.
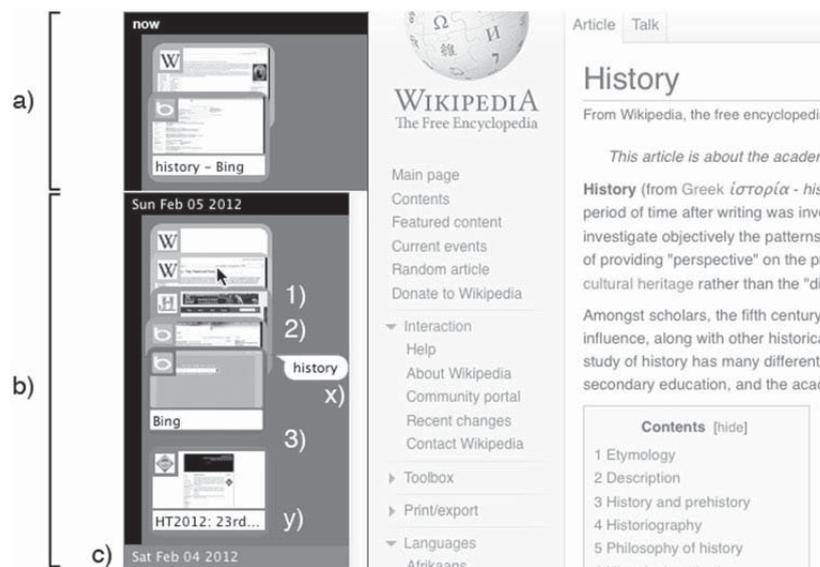

Figure 1: History Deck is implemented as browser sidebar and dividend into present a) and past b), where currently open tabs and page visits are shown grouped by days c). Text is displayed as speech bubbles x) and narrative boxes y). Transitions between page visits include subject-to-subject 1), scene-to-scene 2) and non sequitur 3) transition.

2.1   Structuring history

Within the story events can be modified in ordering, frequency and duration (Genette 1998). Browser history narrates the plot simultaneously. Therefore events are ordered chronologically and browser history turns into a chronicle. Revisits could be interpreted as flashback (analepsis), but can happen through reflection and would change the context (Bernstein 2009). Therefore chronological ordering is kept. On the other hand revisits through history would create a meta history and are not displayed to remain overview. Additionally, needless events like advertisements are omitted (ellipsis). Another dimension of narrative time is frequency. As apposed to repeating events in browser history singulative narrative is more reasonable for saving screen real estate. Moreover applying the iterative style of narrating and summing up cyclic events seems reasonable, but users' motivation is hard to distinguish. Within the forms of structural organization of page display temporal organization structure matches best for displaying pages in chronological order (Cockburn 1999). Furthermore by

arranging elements in one single dimension it consumes less space. This is crucial, because users constantly compare consumed space with the value of information offered (Cockburn 1999) and the history requires for continual attendance within the users range in order to provide permanent feedback. As a drawback overview is reduced. This can be improved by advanced structuring or clustering within coarse-grained temporal segments (Cockburn 1999) and is done through grouping by days. In narratology duration analyzes the relation between time in story and plot. Variation can provide different level of detail and can save space. This is applied by collapsable groups (Figure 1, c). Further structuring can be achieved by visualizing hyperlinks. Although this is important for hypertext, there is no space saving solution for the temporal lists (Bernstein 2009). This shortcoming will be approached in section 2.3.

2.2. Visualizing history entries

The comic art theorist Will Eisner defines an „image" as the memory of an object or the experience recorded by an narrator either mechanically (photograph) or by hand (drawing) (Eisner 2006). In hypertext interaction this object is equal to the web page it self. It is recorded mechanically by the computer (perceptual instance). Therefore visits of web pages are visualized as screenshots. Visualizing time is possible through transferring it into space. As a result the panels extent is equal to the elapsed time (McCloud 1994). Instead of resizing screenshots to modify their dimension, the metaphor of a card deck is applied. Screenshots get stacked up and pages are drawn out of the deck depended on the duration of each page visit (Figure 1, 1). According to the duration in narratology text in comics is represented in three forms. While onomatopoeia is mostly used for effects, expands time in a descriptive way and takes away too much space, correspondent manner of narrating is applicable. This form is equal to direct speech, represented by speech bubbles in comics and is assigned to typed text in hypertext interaction (Figure 1, x). Summarizing behavior spans the plot within panels and is achieved through narrative boxes in comic art. Titles of web pages hold a similar functionality and are visualized alike (Figure 1, y). Through its clipping and perspective a panels frame not only gives insight into the scene, its color can provide additional information (Gershon 2001). Therefore frequency of visits is encoded. Highly visited pages are displayed more prominent and can be localized quickly for access and orientation (Figure 1).

2.3   Characterizing and visualizing transitions

Panels as well as page visits are connected by their transitions respectively links. For comics McCloud defines six different transition types (McCloud 1994). In the following these are presented and analogies to browser interaction are made: Within moment-to-moment a single subject is depicted over a short period of time. In hypertext semantics this equals the scanning of a web page with the mouse. This interaction can be random and is not valuable for history visualization. A transition from action-to-action also characterizes a single subject, but over longer period of time. This is equal to more specific actions like typing text on a web page. Instead of using a separate panel, a single one is used and screen space is saved. From subject-to-subject pages are switched, but the same scene is remained. This points to a strong coherence, which in hypertext concept is equal to a hyperlink and can be depicted as

stacked cards as shown before (Figure 3, 1). Switching form scene-to-scene preserves the connection in a looser way. It is like keeping the same main task, but changing into a sub-task. According to deck metaphor this can be visualized as parenthesis (Figure 3, 2). The transition type aspect-to-aspect is similar to the one from scene-to-scene with the difference, that time stands still. This could be the time where the user reflects while using the history list and is not going to be displayed. Non sequitur transition has no connection at all. This is the same as starting a new task or switching tasks and is visualized as a separate deck (Figure 3, 3).

3   Conclusion

An analogy between hypertext and storytelling is introduced to improve browser history visualization. The user is identified as the narrative instance and computer as the perceptual instance. Users' tab interaction captured by the computer is being used to organize events of the story and create the plot automatically in real-time within the context of his current work. These were used as fundamentals to create structure and visualization of the history realized as a browser add-on. A final evaluation of the prototype is outstanding to judge its usability. With regard to the theory, constructing the analogy has its limitations. Computers can only execute given commands, but cannot interpret them. Additionally, panels perspective and clipping can be utilized to direct users attention and show relevant elements like form fields. Prioritizing important elements is challenging and motivates for further examination.

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