

# HyperHistory: Poster Proposal

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## ABSTRACT

HyperHistory is a web browser extension supporting the user's browsing habits. Second only to processing information, finding it is the most essential task. As users frequently return to previously seen documents, this work focuses on revisitation patterns. The extension improves the browser's navigational facilities and alleviates some of the most urgent and well-documented issues both built-in and third-party solutions have not yet successfully solved. HyperHistory attempts to mend the rift between the user's mental model and the context-less representation the browser's history provides. Furthermore, the extension lessens the affordance necessary to efficiently gather and retrieve information by preserving the semantic context based on visited hyperlinks and estimating the value a single page has to the user.

### Categories and Subject Descriptors:

H.5.4. [Information Interfaces and Presentation]:  
Hypertext/Hypermedia – *navigation, user issues*

**General Terms:** measurement, design, human factors

**Keywords:** history, revisitation, navigation, bookmarks, browser, adaptive hypertext

## 1. INTRODUCTION

HyperHistory addresses the following long-existing and well-known issues users experiencing when browsing the internet: disorientation (caused by a rift between user's mental model and browser's history presentation), cognitive overhead (the user has to put too much effort when revisiting pages), and organizing retrieved information.

The most important aspects of revisitation that research has identified are: high *recurrence rate* (80% of all visits are to previously visited pages), users tend to revisit pages just visited a short while ago, users frequently access a small set of personal favourites, and users browse in very small clusters of related pages. [2, 5]

Although research has proposed a number of viable solutions, major browsers have not yet managed to successfully incorporate any of these. HyperHistory integrates into the browser and picks up on Cockburn's recommendations [2] by providing a context-oriented history representation with an adaptive personal recommendation system.

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## 2. APPROACH

### 2.1 Episode

Episodes are clusters of pages that share a semantic context. This context is based on links and temporal proximity.

While the user is browsing, HyperHistory records each page and its referrer, thus the context is built by tracking the user's way through the web. The emerging structure is solely based on the user's actual path (as opposed to applications that only extract link structures from the documents regardless).

Using this **user-constructed structure**, the HyperHistory avoids problems stack-based history lists have. (In certain scenarios, these remove elements from their list, which to the user means losing access to the respective pages.)

In addition, capturing **links across browser windows and tabs** ensures the **consistency** of the episode - opening links in a new window does not disrupt the history's ability to aid the user.

Parallel episodes are supported, e.g. when a user performs different tasks at the same time.

Episodes are the back-bone of the HyperHistory's adaptive history system, allowing other parts of the application to gain knowledge about how resources are semantically related.

### 2.2 Weight

The HyperHistory needs a method to derive a resource's **subjective relevance to the user** to adapt to the user's needs and habits. By weighing resources based upon more detailed and user-oriented factors than the regular history does (i.e. date of last visit and visit counts), the HyperHistory can take a better guess at how important the information on a particular page is to the user at a particular time. These factors are: **visit date** and **visit frequency**, **duration** of each visit, and whether the page has **user-added information** associated with it (e.g. dog-eared, keywords).

When calculating a page visit's initial weight, the most important of these factors is the total time the user consciously spends on a page, as it gives the closest indication of how much impact the information on a page had on the user.

Visits lose importance over time; to account for the decay of the level of activation of a memory – which is “determined by how frequently and how recently we have used the memory” [1] – a function approximating the forgetting curve is applied to each single visit.

Through this approach the HyperHistory mimics the way the human handles information, and is able to present resource lists (like search results or AutoBookmarks) with a ranking that resembles how the user remembers it.

### 3. APPLICATION

To be truly helpful yet unobtrusive, the system is integrated into the host application to spare the user any extra effort to efficiently make use of it. By integrating the application into the web browser, HyperHistory can build upon existing functionality and program hooks to track the pages being visited, process the gathered information and create the respective visual interfaces.

HyperHistory supports the user's main tasks (browsing, searching, and revisiting) by providing specialized views for its core functions (**LiveHistory**, **AutoBookmarks**, **Search**). It's accessible in an instant while staying in the background and saving precious screen space when it's not needed, thus making it suitable for everyday use.

The goal is to offer a representation making it easier for users to recognize a single page, and its associate episodes. As research suggests this view uses middle-truncated titles, and shows Favicons<sup>1</sup> to better support recognition [4].

Additional page information such as dog-ears and added keywords are quick and easy to use.

#### 3.1 LiveHistory

##### 3.1.1 Episode History

The Episode History view reduces the clicking distance between where the user is and where he wants to be by showing all the episode's visited pages, each reachable with a single click. The episode view uses a tree visualization representing the user-created structure of visited pages. When a page is re-visited while the related episode is still active, HyperHistory does not add a duplicate of the resource to the tree, but updates the resource's visit date. The position within the tree remains the same.

##### 3.1.2 Recent History

The Recent History encourages users to directly access pages, showing a more efficient episode-based recency list of related documents [2]. Its compact view provides shortcuts to recently visited pages.

##### 3.1.3 Personal Roadmap

The personal roadmap recommends a selection of pages the current page refers to (because the user is revisiting an existing path). This list is ordered by weight to predict the most probable targets of revisitations, thus lessening the affordance for the user to rediscover these pages (most useful in the current local context), answering the user's question "Where did I go from here?"

#### 3.2 AutoBookmarks

AutoBookmarks provide the user with a list of links he most likely wants to visit again, based on his previous browsing patterns. AutoBookmarks is an "adaptive system, using dynamic models of previous inputs to predict subsequent ones" [5].

The AutoBookmarks serve the same purpose the Personal Roadmap does, but take into account all visited pages, thus reflecting the user's *personal favourites*.

#### 3.3 Meta information

Although the HyperHistory automatically collects information about a page, it is beneficial to allow further classification.

In distinction to personal and social bookmark, that require their users to manually add pages (even when not using these systems' categorization or tagging features), HyperHistory records the visits to all pages and presents the most relevant items as AutoBookmarks. To also accommodate manual emphasizing of pages, the HyperHistory uses the metaphor of dog-earring as a way to easily flag it as being important [2,3].

Also, keywords and images can be quickly associated with a page via a dedicated context-menu. The HyperHistory's search capabilities provide means to query this information.

These features lessen the effort the user has to put into categorizing pages and maintaining a bookmark list to revisit.

In conjunction with the episode idea, this suggests the potential for a collaborative history, where users share episode and meta information.

### 4. CONCLUSION

HyperHistory presents a combination of both existing and new ideas to solve urgent problems people have browsing the internet. The goal is to mend the browser's history's shortcomings and add more useful ways to support hypertext navigation and information retrieval.

We chose to implement it as an easy-to-install extension for the popular Firefox browser to enable regular people to use it and not restrict the target group to tech-savvy users.

The HyperHistory project can be considered a building block for a number of different applications serving a multitude of needs. Future work on the HyperHistory will address topics such as collaborative use of episodic information (rating a page's relevance in task-oriented episodes), full text index, thumbnails, and increase scope and quality of adaptiveness.

### 5. REFERENCES

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<sup>1</sup> Kaasten recommends the use of thumbnails, the HyperHistory will integrate these in the future as well.

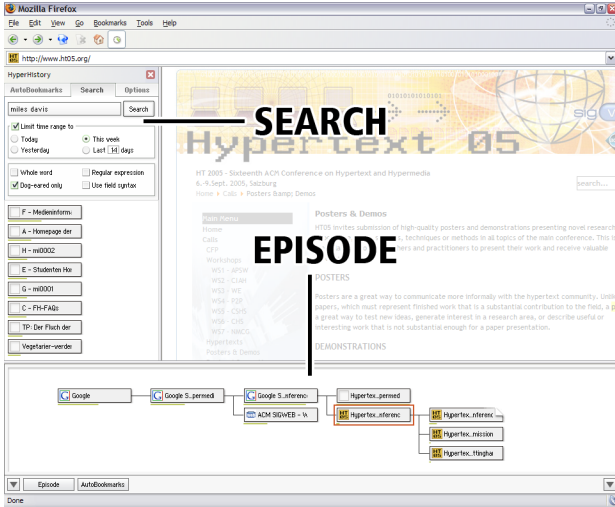


Fig. 1: HyperHistory's Episode and Search views

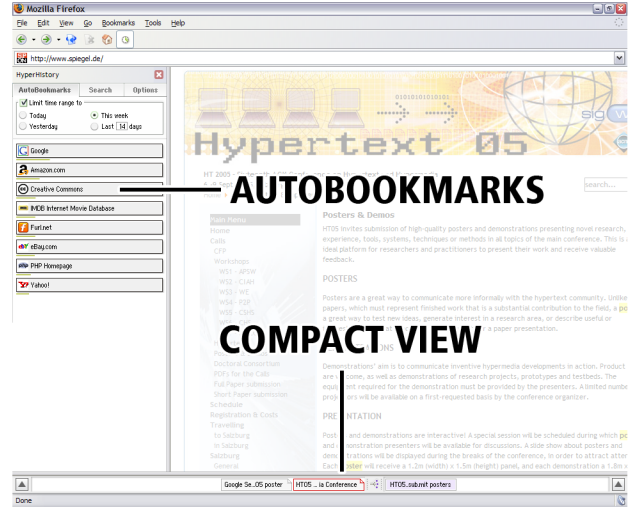


Fig. 2: HyperHistory's AutoBookmarks and Compact views

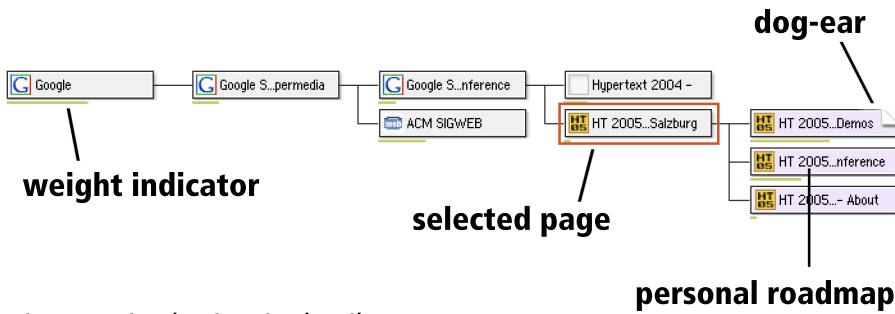


Fig. 3: HyperHistory Episode view in detail

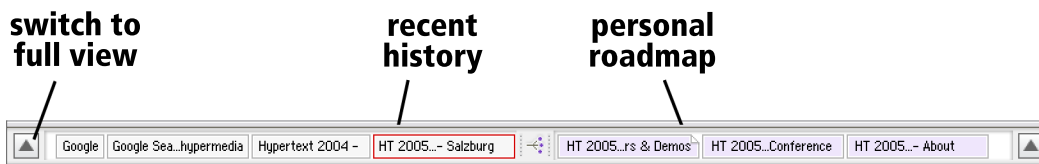


Fig. 4: Compact view containing recent history and personal roadmap views

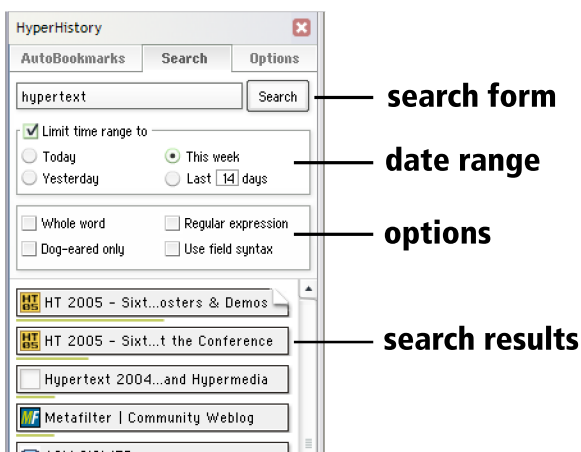


Fig. 5: HyperHistory Search view in detail

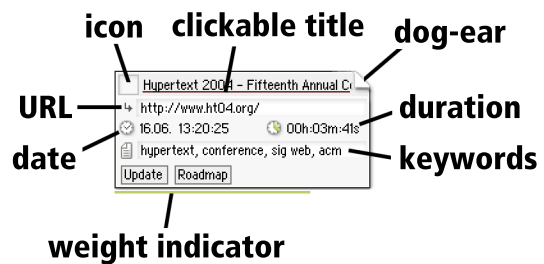


Fig. 6: Meta information (in Episode View)

**HyperHistory**

<http://hyperhistory.netzministerium.de/>