

Collage, Composites, Construction

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ABSTRACT

Tinderbox, a hypertext tool for making, analyzing, and sharing notes, explores the use of collage to build and share linked conceptual structures. Adopting a simple, regular data structure that exploits prototype inheritance and transclusion, Tinderbox helps build malleable, personal documents that are partially self-organizing.

Categories and Subject Descriptors

H5.4 Hypertext/Hypermedia Architectures

General Terms

Design, Experimentation, Documentation,

Keywords

Hypertext Systems, Tinderbox, Storyspace, Spatial Hypertext, Collage, Composites, Weblogs, Patterns of Hypertext.

1. COLLAGE AND COMPOSITES

Hypertext creates connections in three ways. We may follow links that move from one thing to another. This is *montage*, and (as in film) we find that much of the meaning resides neither in the place of departure or the point of arrival, but in the gap between [1]. Alternatively, we may *transform* one thing to another, either through a stretchtext system like GUIDE [2] or an outline processor, or by animating the text itself [3]. Finally, we may establish connection by placing one item near another. This is *collage*, and once more we find that meaning is made between items: the juxtaposition of items can create, express, and qualify meanings [4].

Collage is particularly attractive for the process of hypertext writing because the continuity of space helps writers express speculative, contingent, and informal relationships. Formal systems, to be sure, offer exciting opportunities for autonomous reasoning and automatic processing, but these goals often have proved elusive [5]. Here we pursue the much simpler goal of helping people discover emergent structure in personal information spaces and electronic notebooks, much as we use large work surfaces to review and organize

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collections of paper notes [6]. Informal structures such as messy piles have renewed interest in hypertext composites — one of the more formal issues of the original Halasz [7].

2. TINDERBOX

Tinderbox is a hypertext tool for making, analyzing, and sharing notes. Tinderbox tries to make it easy to add notes, and to incorporate those notes incrementally and naturally into an organic, unplanned spatial hypertext. Tinderbox extends the Storyspace approach [8], but where Storyspace emphasizes presentation and temporal structure (e.g. through conditional links), Tinderbox emphasizes simple and informal semantics. In particular, Tinderbox notes are represented as lists of attribute-value pairs; some attributes are expressed in system behavior (e.g. Color and Text) while others are simply labels for the user's data.

Tinderbox has links and offers a flexible family of maps, charts, and treemaps. But Tinderbox also embraces collage, composites and transclusion in a new and adventurous way.

3. BUILDING THE PAGE

The core challenge of sharing research notes is not exchanging isolated observations, but rather communicating the emergent structure that users uncover in their assemblage of notes. It's not the individual note card you want to show; sharing facts is comparatively easy. But, when we are trying to discover structure in domains not completely understood, then arranging different elements in space becomes extremely attractive. This observation is not peculiar to spatial hypertext research; weblogs and personal Web portals, for example, often adopt complex, multi-column layouts that juxtapose disparate data (Figure 1).

Many hypertext tools, like Storyspace, let users map hypertext nodes to Web pages. Tinderbox instead encourages the construction of Web pages from lots of small, specific hypertext nodes. Each note is associated with a *template* that describes the translation of information from the note to HTML or XML. For example, the template:

```
<h3> ^get (Created) ^ : ^get (Name) ^</h3> ^text^
```

exports the date, title and body of the note. Templates may also specify inclusion of their children or of arbitrarily-specified notes. In effect, template inclusion creates a network of transclusive linking within the hypertext while encouraging construction of complex composite pages.

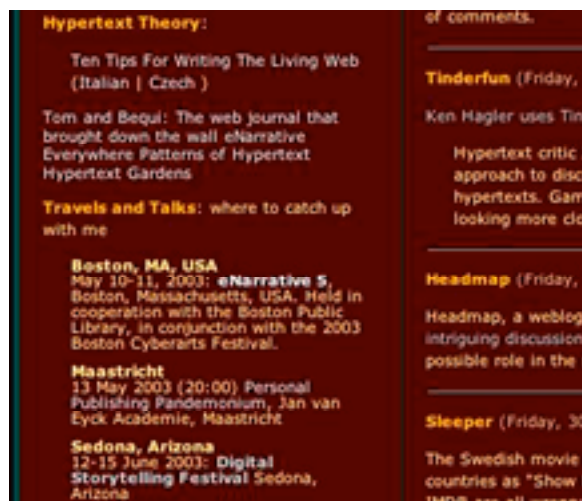


Figure 1: Detail from a Tinderbox Web page. More than a dozen individual notes are visible here. Because notes can be selected, arranged, and included with other notes, the page's collage adapts and, to some extent, organizes itself.

4. PROTOTYPE INHERITANCE

Spatial hypertext avoids premature commitment by assuring users that their organizational decisions are continuous and reversible. Moving related things closer together is less intimidating than asserting set membership or assigning taxonomical class. Tinderbox strives to extend this theme through *prototype inheritance*, encouraging users to incrementally formalize their notes. The payoff for users is immediate and tangible; inheritance saves typing by automatically setting boilerplate text, screen layout, and default values in convenient (and easily modified) ways.

Representing notes as attribute-value lists makes efficient prototype inheritance straightforward; this matters in practice because exporting a personal weblog may invoke 10^5 attribute references. A checkbox (and Boolean attribute) designates any note as a potential *prototype* for other notes; when the value of an attribute is not explicitly specified, Tinderbox searches up the prototype chain until it finds a value. The prototype relationship is simply a link type. Gradual refinement and modification can proceed organically throughout the life of the document; there is no need to establish a taxonomy before starting work. Again, complex patterns of linkage and composition are facilitated by a concrete interface.

5. AGENTS AND ALIASES

Tinderbox *agents* represent persistent queries that continuously interrogate the document. The children of an agent are aliases of notes that meet the agent's criteria; when an agent adds a note to its list of matches, it may also apply a list of actions to the note. For example, agents might look for newly-added notes that mention a key term, and highlight all the notes it locates.

Agents are notes like any other; they may be exported as Web pages (or included on other pages), they may be link targets, and their queries may interrogate other agents. They are, quintessentially, composites and virtual structures in Halasz's

sense, but their use here is so simple that users may regard them as a simple user interface shortcut.

6. TRANSLUSION, SYNDICATION, AND WEB SERVICES

Tinderbox notes are typically stored in a single XML file, but by specifying a URL and setting a Boolean attribute, users may transclude any http-accessible document. Translusive syndication makes it easy for associates to provide access to volatile information while maintaining editorial and computational independence. Students may transclude an assignment page without fear of missing updates. A weblog may transclude another weblog's headlines via RSS, an XML syndication format, creating a useful collage of links to related material while promoting the emergence of hypertext structures between independent sites. The growth of weblog clusters [9] illustrates the importance of this affordance.

In addition to transcluding material *from* a distant server, Tinderbox notes can use Web Services to push information *to* a server. Simple services can have sophisticated rhetorical impact: for example, we may "ping" weblogs.com, sending its server our own URL to announce that we have published an update. A variety of other services, in turn, use reports that weblogs.com publishes. Collaborators may share a weblog, synchronizing their Tinderbox documents with the server at the start of a session, writing locally, and then transmitting changes back to the server. The ever-available server can provide persistent services — publishing comments, recording backlinks — and transparently collage them into the document, while preserving the computational flexibility of a client-centered writing and sense-making environment.

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