Storeys – Designing Collaborative Storytelling Interfaces

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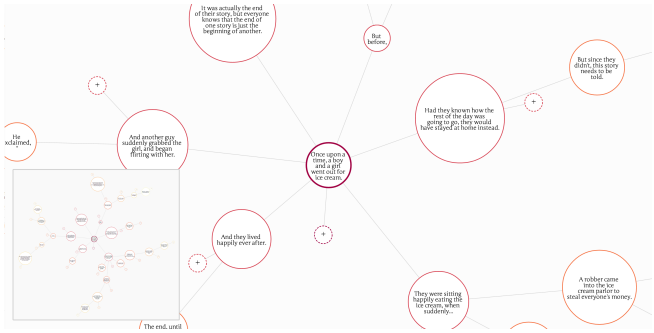

Figure 1: The Storeys interface (Inset: the entire story tree).

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Abstract
Storeys is a graph-based visualization tool designed for collaborative story writing that represents stories in a branching tree of individual sentences. The fine-grained, branching structure supports collaboration by reducing contribution cost, conflict over text ownership, and production blocking. Also designed to be ludic and playful, in initial evaluations Storeys was seen as a fun tool for creativity that balanced the exploration and elaboration of ideas.

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Collaborative writing; text visualization; storytelling; story tree

ACM Classification Keywords
H.5.3. [Information Interfaces and Presentation (e.g. HCI)]: Group and Organization Interfaces

Introduction
Traditionally, the act of writing is a solitary activity, and the dominant computer tools for supporting common writing tasks are WYSIWYG (what you see is what you get) word processors. These processors are oriented toward developing a finished product, with strong support for layout and visualizing the final document. While a linear, canonical view of the text is useful towards the end

Figure 2: FoldingStory, an implementation of the exquisite corpse technique.

of the writing process, when decisions are made about the content and format of the final product, traditional writing interfaces generally offer little support earlier in the writing process. Here, ideas are created, merged, judged, shuffled, and abandoned, and writing is more non-linear, creative, and exploratory. This lack of support for early stages of writing led us to wonder about interfaces that better fit these aspects of creative writing.

With the aim of *supporting creative, collaborative story writing*, we built Storeys, a system designed for collaboration and interactivity, creativity and expressiveness, and pure, unadulterated fun around creative writing. Storeys provides a graph-based interface that supports the creation and visualization of *story trees*, hierarchical collections of sentences.

Unlike most writing tools that focus on a single storyline, or a sequential list of sentences, Storeys allows sentences to have several continuations, or *branches*, supporting creativity and reducing conflict over choices. Unlike most writing tools that focus on pages or documents, Storeys makes sentences the primary unit of work, supporting lightweight collaboration and contribution while making branching more natural. And unlike most writing tools that look, well, like tools, Storeys tries to make writing an aesthetic, engaging, fun experience.

Related Work

Tools for online collaborative writing like Google Docs are readily available, but these primarily support collaborative writing either through writing in turn (with broad cycles of write-review-revise) or partitioning a document into sections [6]. Wikis are another option for collaborative writing whose public nature and copious use of links allows story production and consumption to be more accessible, collaborative and expressive in comparison to single-document models. However, their asynchronicity and page-level granularity makes interactivity and immediacy difficult, and although they (and Google Docs) provide revision histories, there is one canonical version of the story.

To address these limitations, we looked to art and cognitive science. One primary inspiration for Storeys is the *exquisite corpse* [4], a Surrealist technique for producing creative art "beyond imagination", which involves several writers taking turns to write a story, one sentence at a time, based only on the preceding sentence. By concealing earlier contributions, writers are free to create unexpected juxtapositions of sentences and words (Figure 2), while the sentence-level contributions help address the problem of granularity.

To support branching and alternative versions of the story, we looked to mind maps and concept maps, graph-based representations of a set of ideas or concepts. Both encourage succinctness, which works well with sentence-level collaboration, and are designed to provide broad overviews around a topic and visually relate concepts to one another. Concept maps have been explored as an educational tool before[7], and we see them as an interesting tool to explore for supporting storytelling.

Design

Storeys draws upon these inspirations, leveraging the concurrency of Google Docs, the rich linking of the wiki, the creativity and serendipity of exquisite corpse, and the holistic organization and overview of the mind map.

As shown in Figure 1, Storeys provides a graph-based

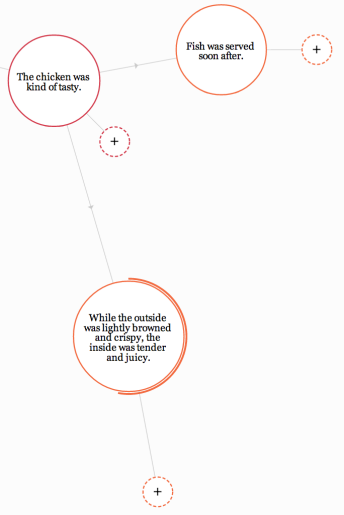

Figure 3: A newly added node (bottom).

visualization of a story tree [1], with the root node representing the beginning of a story and subsequent sentences of the story radiating outward[2]. These nodes are arranged in a force-directed layout and can be moved by the user. To provide a sense of how far along one is in a branch, the colors change with increasing distance from the root node. Users can pan and zoom around the story map to explore branches and expose varying amounts of context, and can add a branch to any node by clicking the special "+" nodes attached to every sentence. Paragraphs are automatically split up into constituent sentences.

Below, we discuss in more detail how Storeys supports collaboration, expressiveness, and fun.

Supporting collaboration and interactivity
We designed Storeys around concurrency, allowing multiple users to simultaneously work on a story, and branching, allowing any sentence to have any number of continuations. À la Google Docs, we enable multiple users to work on a story tree at the same time, with real-time collaboration supported through WebSockets. Nodes that other users add are initially highlighted, then gradually fade to their original color.

The non-linearity of the story tree allows users to work on different parts of the story and to consider alternatives more easily than Google Docs or wikis. This minimizes production blocking, while sentence-level collaboration leverages the aspects of exquisite corpse that encourage granular interaction and building on each other's ideas, thus supporting a stronger sense of ownership, positive interdependence, and remixing [5].

We decided to make nodes essentially non-editable, as editing a node might harm other stories that branched from it, while conflict in collaborative editing can arise from either users' changes being overwritten or their contributions being modified in undesirable ways [2]. Still, nodes remain editable for about 1 minute after they are created for quick correction, with circular arcs indicating the remaining time (Figure 3).

Finally, we chose to not require logins, and like Wikipedia, hoped that anonymous contribution would reduce the potential for feelings of territoriality and evaluation apprehension, and further reduce barriers to contribution.

Enabling creativity through expressiveness
Branching reduces a user's cognitive load in using Storeys and enables spatiality in storytelling. By allowing users to create many nodes, without worrying about replacing text one might want to revisit later or losing progress in a specific branch, we believe Storeys is less cognitively demanding than forcing people to choose a particular continuation [3].

Concept map-based representations also facilitate information recall, orientation, and navigation through dual coding, the use of visual imagery in addition to verbal association [1]. Zooming allows Storeys to provide different degrees of intentional concealment, limited sight lines, and juxtaposition, key ideas that underlie the creativity of exquisite corpse. This allows people to tune their use of Storeys to their story writing goals and the current state and needs around constructing a given story.

Fun
While Storeys was designed as a tool for story creation, we also see it as a tool for play. Specific interface tactics, such as the interactive, fluid feel of the force-directed layout, the ability to move and place nodes, and the

[1] Storeys also supports arbitrary linking.
[2] The system was implemented using Ruby on Rails and D3.js.

simple interaction style and colorful themes, support a sense of play and aesthetic engagement.

By supporting synchronous interaction and collaboration for both in-person co-present interaction and distributed use, and by providing for flexibility of use [8] in the way stories are created and laid out, we hope that Storeys facilitates flow, the state of being fully engaged in and enjoying an activity, which in turn supports fun.

Conclusion

Initial evaluations in a public installation and in small distributed groups suggest that Storeys largely accomplishes its design goals, supporting creative collaboration that allows for both the exploration and elaboration of ideas, both in person and remotely.

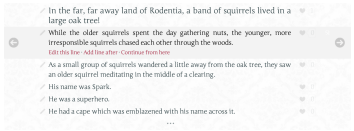

Figure 4: A linear representation of a story tree.

We see Storeys, and the design ideas embedded in it, as useful contributions around the design of interfaces to support creativity. While Storeys in its current form is not a tool for producing a completely fleshed out story, its flexible interface allows it to be used as a medium for brainstorming, among other creativity-focused uses.

Further, Storeys might be expanded in a number of dimensions through making alternate choices. For instance, although we chose anonymity to reduce barriers to contribution, recognition is also important, and allowing logins and giving credit for activity might motivate people to contribute more. Other representations of the story tree might support alternate uses or interpretations—Figure 4 shows a linear view generated from a story branch, allowing users to switch between branches with specialized controls or gestures. Early users also sometimes embedded questions about the system or the ongoing story "in-band" as part of the story tree, suggesting that a parallel commenting system, like Wikipedia's talk pages, might help users better coordinate around stories. Finally, arbitrary linking of disjoint branches may allow for richer, more elaborate stories. Our ongoing work around Storeys will focus on evaluating and improving these decisions to develop a flexible tool for creative, fun collaboration.

Acknowledgements

TBD.

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