StorySpinner: Explorations in Narrative Hyperstructure

Clare J. Hooper

Intelligence, Agents, Multimedia Group
University of Southampton, UK

cjh302@ecs.soton.ac.uk

ABSTRACT

This paper describes the StorySpinner system, a sculptural hypertext reader used as a test bed for experimenting with the authoring of narrative flow in automatically generated stories. An overview of the system is presented along with discussion of authoring issues and results of initial user trials, and an examination of high-level narrative effects.

1. INTRODUCTION

The StorySpinner system generates stories based upon symbols selected by users, allowing them to read narratives and explore hypertext in a novel fashion.

The idea comes from the novel *The Castle of Crossed Destinies* by Italo Calvino [3]. In the novel, the narrator arrives at a castle inside which no one is able to speak. To communicate their stories the other travellers use tarot cards, with the symbols on the cards representing events and characters in their tale. The narrator interprets the tarot cards forming the particular story of each traveller.

StorySpinner follows the sculptural hypertext model of authoring; here, nodes are initially scoped by their available connections to cards through interpretations. As cards are played, connections are effectively removed from the possible readings [1]. Metadata attached to the nodes allows the author to control the pacing of the narrative.

Readers generate a story by selecting tarot cards from an available set; StorySpinner generates a narrative based on a set of pre-authored nodes and possible interpretations of the particular tarot cards.

The next section discusses StorySpinner in more detail. Issues surrounding the authoring of narrative flow were investigated and results from initial user trials follow. Finally, this paper examines the effects of style and genre within the StorySpinner system.

2. THE STORYSPINNER APPROACH

Like the previous narrative engines of Card Shark [1] and the HEFTI storytelling engine [4], StorySpinner is a tool to organize narrative segments, rather than generate text itself.

Readers are presented with a set of 22 tarot cards, and during the reading choose a sequence: the generated tale is based upon interpretations of this sequence, with early cards affecting the meaning of later ones; different card sequences generate different stories.

The underlying hypertext within the StorySpinner system is influenced by two factors: links and constraints.

Each onscreen card has 10 to 15 possible interpretations from a set of just over 200; for example, the card 'The Fool' has interpretations including 'joy', 'optimism' and 'new beginnings'. Similarly, each story node is linked to a subset of the interpretations from the list, and thus the interpretations act as links between the cards and story nodes.
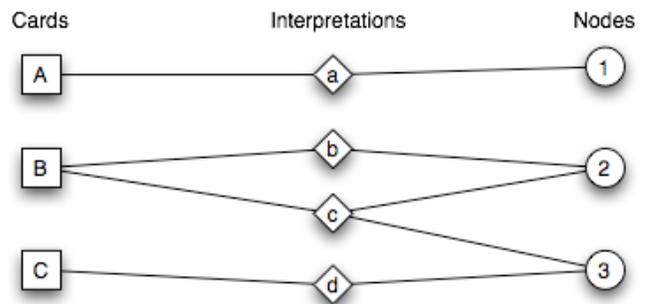

Figure 1. The StorySpinner links.

Figure 1 shows a possible subset of a StorySpinner tale. Choosing card A prompts display of node 1 via interpretation a; similarly, card C leads to node 3 via interpretation d.

Card B may lead to nodes 2 or 3, via either interpretations b or c. The card is more strongly linked with node 2, as this shares interpretations b and c, whilst node 3 only shares interpretation c.

Constraints, logical rules, are used to ensure that generated stories are sensible as well as linked with the chosen cards. These are of type time (e.g. ordering two nodes, to enforce a chronology) and logic (e.g. disallowing two nodes from both being shown in one story, avoiding mutually exclusive events). The constraints filter out inappropriate nodes, with the aim of maintaining context. Context within sculptural narrative has been discussed previously [2].

This therefore means that readers navigate through a story using the metaphor of tarot cards. This metaphor abstracts away from the concept of a direct link (for example, one might choose to

click on a character's name when reading a traditional hyperfiction; this is not possible here), instead leading readers to choose based on what moods and events they associate with the cards. At this stage, no exploration has been made into reader associations and methods with this style of hyperfiction.

Figure 2 shows a partial screenshot of the StorySpinner prototype interface. A selection of cards is available in the upper half of the screen, with the current reading displayed below.
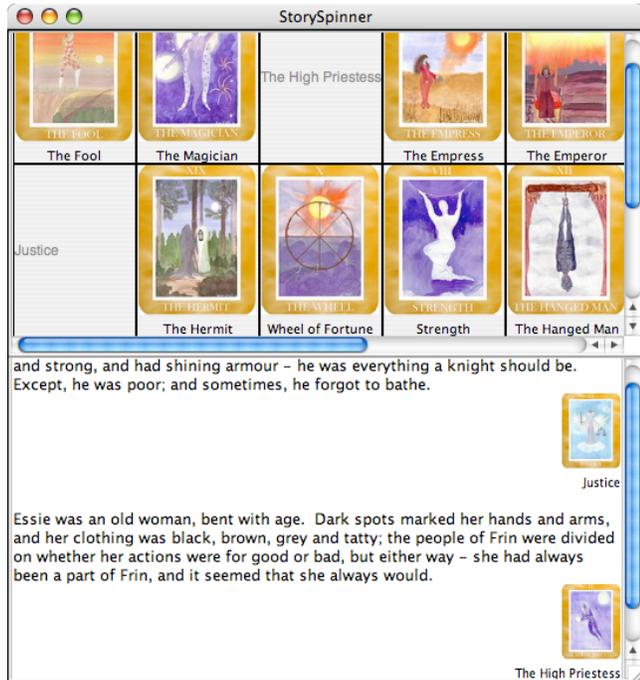

Figure 2. StorySpinner screenshot.

This approach raises semantic implications. Readers will have different perceptions and interpretations of the set of cards onscreen, and therefore are likely to expect different events to result from their choices. It is because of this that the interpretations are not currently made available to the readers – initial trials suggested that this visibility was a distraction from the story.

Another consequence is that it is possible to substitute the current set of tarot cards for alternative symbols (perhaps with more intuitive interpretations); the system is versatile in this respect. This would probably limit the interpretations available to the author but might grant the reader further control.

It is of note that although the tarot card metaphor is unusual, it is not without advantage. As well as acknowledging older storytelling traditions, it demonstrates user adaptability: readers engaged with the system and stories produced.

3. AUTHORING

At present, no authoring tools exist for StorySpinner. Any such tool must enable authors to link each node of story with a subset of the available interpretations. One possible approach would be to utilise a GUI to visualise different 'areas' of interpretation. Instead of choosing interpretations from a large list, an author might click on areas of a grid, or use several sliders, which represent certain areas of interpretation. One corner might represent justice, fairness etc., and another strength, fortitude and power.

It is possible that the current list of interpretations would need to be reduced in order to allow use of multiple available decks of cards, such that available interpretations are more general. Reducing available interpretations also makes the author's task easier in that there are fewer possibilities to link with.

Interpretations have different strength of meaning: for example, a node in the *Three Little Pigs* describing the building of the brick house is associated with strength (the strong house) and separation (the pig has left home for good). The former association is more immediate to the scene, and so stronger, but the current system has no way to show this. A possibility would be to add a `Strength` variable, which might indicate the importance of the link. Again, this adds to the author's task when linking interpretations with nodes.

StorySpinner views a narrative as a structure made up of three acts. Each story node is therefore marked according to the act(s) in which it is appropriate: a tool to enable this might also be visual, with three spaces representing each act, and nodes sitting in discreet spaces, or upon boundaries between two (or in a separate area representing nodes which may occur at any point in the story).

Use of the card metaphor abstracts away from the actual links – for the reader. Currently, authors must add each individual link, choosing from over 200 interpretations for each node; an arduous task.

A solution to this issue might be to capture a subset of 'moods', which themselves hold a set of interpretations: for example, a joyful mood might capture interpretations including 'excitement', 'fulfillment', 'happiness' and of course 'joy'. Authors could then select these moods from a much smaller list, and have the option to add or remove specific interpretations should they so desire.

Another useful tool would allow automated checking of stories; it would examine the set of time and logic constraints for a given story, in order to determine whether there exist any unreachable states or conflicting rules.

Additional functionality of the checking tool might be an ability to track the paths within a story; a graphical representation of the overall structure of any given story would certainly be of interest.

4. READING

Two hyperfictions have been written for the StorySpinner system; the first of these is an adapted version of the fairytale *The Three Little Pigs*, whilst the second is a short adventure story entitled *James' Tale*.

When testing the system, huge differences were found between the two stories, both in terms of quantitative changes and qualitative responses. Testers came to read *The Three Little Pigs* with expectations of their own, being familiar with the fairytale (one tester later remarked that, "in *The Three Little Pigs*, an unexpected twist was not a twist but a disappointment").

Other differences, not attributable to prior knowledge of one story, also arose. *The Three Little Pigs* had far fewer branches; as

a result, the occurrence of dead ends (states where, before the story's end, a card is chosen but no suitable story node matches) during reading was far greater. For example, during five simulated readings, eight dead ends were encountered; during the same five simulated readings of *James' Tale*, only two occurred.

Although only these two stories have been tested in this way, the wide differences even at the scale of short texts suggest that genre has a highly significant impact on the links and paths of a story.

Other results from the trials were that readers chose cards in different manners: some based their choice on the pictures, others on patterns of cards, some using the card text, whilst others were more literal (e.g. clicking on 'The Moon' when it might be night time).

It seems likely that readers will initially experiment with different methods of choosing the next card before settling with one approach; discerning this eventual reading style is difficult due to the artificial nature of the testing situation and the newness of the system to readers.

5. OVERALL EFFECTS

StorySpinner is ideally suited to exploring the effects of both style and genre on a given fiction. The system is designed such that a given story may be read in any of five available styles: these styles are standard, brief, descriptive, illogical and explore.

The system enables these different styles through use of metadata. Each story node has a flag marking whether it is descriptive in nature, and also whether it is required within events in the current story. Given this data, the system may give priority to, say, descriptive nodes when choosing which node best matches a card.

StorySpinner views each story as having three separate acts, moving to the next act once all currently required events are fulfilled. Again, metadata logs the acts in which a given node is valid. This aspect is utilised in the standard reading mode, where descriptive nodes are given priority in act one, no bias occurs in act two, and required nodes are given priority in act three; this thus simulates an increase in narrative pace as story events build up and eventually conclude.

The brief mode ignores all descriptive nodes; the descriptive mode actively seeks them out; the illogical mode ignores all constraints; the explore mode uses only descriptive nodes.

This means that one given story will provide, as well as many readings, which vary according to the sequence of cards chosen, five different styles of reading for each card sequence.

Initial trials yielded very positive responses about this aspect of the system. Further investigation into what other styles can be created (for example, a style which ignores time but not logic constraints), and how to implement these, would be of great interest; similarly, investigation into how authors wish to use constraints would be of value.

Additionally, work on StorySpinner has provided some information with respect to the effect of genre. The StorySpinner linking mechanism raises several possibilities. Some cards will be strongly linked with a given story, having links to many nodes. It is possible that the set of strongly linked cards might suggest the genre or themes of a story. Similarly, interpretations are positive (a blessing in disguise, absolution, achievement) or negative (abuse of power, anger, arrogance): the range of positive/negative link variation across a story might also allow extrapolation as to its content and type.

Knowledge of what cards and link types indicate about a story might also make the generation of future stories easier: awareness of what is characteristic of a thriller may well be make it easier to write or generate one.

It might also be possible to automatically link story nodes with interpretations, through use of a dictionary of key words. For example, a node in which the protagonist rages about corrupt solicitors might be linked with interpretations such as justice, fairness, anger, wealth and other such areas.

6. FUTURE WORK

The three act structure and required/descriptive tags of the current system are sufficient for a generally 'sensible' reading, but simplistic. A more sophisticated approach might result in better stories.

Future work may involve altering tales according to the current reader – perhaps according to mood, age or gender. Alternatively, StorySpinner could look up information such as the season, time of day or weather and adjust stories according to this.

Wildcards could be used to explicitly track characters and locations: for example, $villain could denote the Wolf in *The Three Little Pigs* or Norikay in *James' Tale*. A story node containing character X then gains that character's interpretations as well as those of its own – thus, a node containing Mother Pig may be displayed if a card linked with motherhood is chosen.

Conversely, if the best matching story node includes a character as yet unmentioned, the text of that node could be preceded with a description of that character.

7. CONCLUSIONS

StorySpinner currently acts as both a reading mechanism and an authoring test bed: it allows exploration of the effects of constraining the tale in terms of descriptive nodes and logic constraints. Although the prototype focused on a simple three act structure and pace, future versions may look at manipulation of stories according to characters, locations, chronology and mood.

A narrative can be seen as a path through story nodes: when the writer chooses this path, a linear text results. When the reader chooses the path, it is a hypertext. StorySpinner is unique in that the 'layer of cards' hides the actual links from the reader, and yet it is nonetheless reader choice that determines which node is viewed next. Readers cannot question the associations, as they are opaque, granting the author greater flexibility.

Writing fiction can be compared to writing code: a linear story is like a procedural program, where things happen in a set sequence. Procedural representations encode how to achieve a particular result – the linear story.

By contrast, hyperfiction requires an almost declarative approach. Declarative representations hold knowledge such that it may be manipulated (choosing the story path), and generally allow the knowledge to be used in ways that the system designer did not foresee (story paths the author is unaware of). When writing

hyperfiction, one must write not only the story text, but also the linkage and rules to accompany that text

The StorySpinner system has investigated control of narrative flow in hyperfiction stories through implementation of different reading styles. The system's ability to generate 'sensible' stories as well as general perceptions of this type of hyperfiction have been examined through user feedback.

8. REFERENCES

[1] Bernstein, M. Card shark and thespis: exotic tools for hypertext narrative. In *Proceedings of the twelfth ACM conference on Hypertext and Hypermedia,* pages 41–50, ACM Press, 2001.

[2] Bernstein, M., Millard, D. E. and Weal, M. J. On writing sculptural hypertext. In *Proceedings of the Thirteenth ACM Conference on Hypertext and Hypermedia,* pages 65–66, ACM Press, 2002.

[3] Calvino, I. The Castle of Crossed Destinies. Vintage, Random House, 1977.

[4] Ong T, Leggett J., A Genetic Algorithm Approach to interactive narrative generation, *ACM Hypertext & Hypermedia Conference, Santa Cruz, USA,* pages 181-182, 2004.

9. ACKNOWLEDEGMENTS