

Uncommon Patterns - Authoring with Story Specific Structures

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Abstract. In interactive narrative research there has been a lot of interest in common structural patterns, both as a way of critically analysing work and as a scaffolding mechanism for authoring systems. But stories can contain uncommon patterns that are unique to that story. These may be just as challenging to manage, but are much harder to support in an authoring tool precisely because they are bespoke. In this paper we look at uncommon patterns in interactive story designs, and report on some initial work to support these using a Domain Specific Language (DSL) based on typescript. We show how this approach does allow for the easy construction of repeating complex structure, but also that the technical and expertise barrier for the use of such systems is high. We then consider how the main benefits of this approach may be made more widely accessible. Our work shows that support for Uncommon Patterns would be a useful addition to authoring systems (in both the writing, and editing/revision stages), but also that more work is necessary if they are to become more widely accessible.

Keywords: Interactive narrative · Authoring · Narrative Patterns.

1 Introduction

In interactive narrative, patterns are common structures that can be used as a means of critically analysing and better understanding existing works, examples in hypertext include *cycles*, *foldbacks*, and *mirrorworlds* [1], as well as a tool to guide authors in the construction of new stories[3]. These patterns can be incorporated into authoring tools in order to provide high-level narrative constructs that can be used as building blocks, instead of requiring the author to immerse themselves in implementation details[5]. However, we propose these stories also contain uncommon patterns which are unique to that story, yet repeatedly used within it. These uncommon patterns can themselves be useful building blocks within a given story, however they are challenging to incorporate into an authoring tool precisely because they're unique to specific stories.

In this paper, we identify uncommon patterns in example interactive story designs. We then report on our initial work to support them through a Domain Specific Language (DSL) which allows authors to create and easily reproduce author-defined patterns during authoring.

2 Background

Patterns as a term for mid-level structures was first used by Bernstein to describe the structure and topology of node-link hypertexts, sometimes referred to as calligraphic hypertexts. [1, 2]. His work identified several common patterns that were heavily used in the hypertext fiction of the time, but still remain applicable. Since then, the idea of patterns has been used to analyse existing narratives [8] but also to assist in authoring, particularly in the Sculptural Hypertext space. Sculptural hypertext is a constraint (or quality based [10]) model originally proposed by Bernstein [2], where content nodes are made available based on the satisfaction of conditions associated with each node. When a node is visited, it is capable of making changes to the state of the story, in turn determining which nodes will subsequently be accessible. Millard et al. [6] and Hargood et al. [3] identified a number of common patterns in sculptural hypertext and based on this work proposed the notion of pattern-centric authoring [5]. Pattern-centric authoring attempts to increase the accessibility and reduce the complexity of sculptural hypertext by using high-level patterns as building blocks for the narrative, as opposed to individual constraints.

However, while incorporating common patterns into authoring tools may provide useful structure to new authors and can simplify the authoring of narratives that conform to these common patterns, it does little to help the authors of novel narratives that deviate from these norms.

3 Examples of Uncommon Patterns

We've identified uncommon patterns in several of the stories that we have worked on in the past.

For example, *Isle of Brine*, is a locative narrative created as part of a cooperative inquiry into authoring [4]. It makes heavy use of phasing, a common pattern where nodes are grouped into phases and the reader can only see the nodes in the phase that is currently active [3]. *Isle of Brine* is divided into three major acts, with each act having a pair of phases: an introduction phase and a content phase. Whilst phasing itself is a common pattern, the notion of an introduction phase (that in *Isle of Brine* leads people to the location of the next act) is an example of a simple uncommon pattern which appears three times in the overall structure (once for each of the three Acts).

Another example is *Fallen Branches* [7], which is also based around phases - but this time rather than a phase representing an Act, it represents one of eleven chapters. Each chapter has the same structure, it contains a single node that progresses the main story to the next chapter, and a set of optional additional nodes (representing letters in the landscape that fill in additional details around the story).

Recently we have been working on Multiplayer Interactive Narrative Experiences (MINEs)[11], these tend to have complex structures (as a result of the interactions of multiple participants) and this makes uncommon patterns even more important.

3.1 Patterns in MINEs

Multiplayer Interactive Narrative Experiences (MINEs) are interactive authored narratives with multiple players that demonstrate the properties of multiplayer differentiability and inter-player agency [11]. Multiplayer differentiability is where each player has a potentially distinct narrative experience [9], while inter-player agency is the ability of each player to affect the experiences of other players.

MINEs can support stories with a wide range of structures, but one example would be where different readers follow different characters (Points of View) through an interactive story, and choose actions for their character that impact the options and outcomes of the other characters being followed by other readers.

As a part of our exploration into the possibilities for MINEs, we designed and began implementing a two player narrative using sculptural hypertext and the StoryMINE engine [11]. This narrative was based around the idea of collaboratively creating the events of the narrative leading up to the characters' current situation.

This narrative was structured in three phases - morning, afternoon and a finale. In each of the morning and afternoon phases, each player would be presented with a number of events they could choose from. These events would either occur in the present day, or be flashbacks to the past, adding something to the shared history of the characters.

For each flashback, both players would be presented with multiple choices for what happened from the perspective of their character. When a player chooses an event it becomes part of the narrative, and the other player is then only able to choose the event that matches the one the first player has chosen. For example, if the first player chooses the 'good' option for an event, the second player would then only be able to choose the 'good' option. In turn, these historical events would unlock new possibilities in future phases.

In this way the players co-create the history of their characters, and by doing so define the possible options for their relationship going forward in the story, and a unique shared history that gives them context for the finale.

Figure 1 shows how this interaction might be implemented. There are 4 nodes: two for each player; one good, one bad. Each good node locks both bad nodes and vice-versa. This structure is repeatedly reused throughout each of the phases, making it a story-specific pattern. By recognising this and abstracting it into a form that facilitates reuse, we can reduce the time taken to recreate the structure and potentially increase the legibility of our narrative, by making it easier to think about at a more conceptual level.

4 Supporting Uncommon Patterns

Much like common patterns, uncommon patterns should be quick and easy to reuse in a narrative. However, unlike common patterns, they also need to be easy for the author to generate from an existing narrative structure. In order to facilitate this, we adopted a Domain Specific Language (DSL) based approach

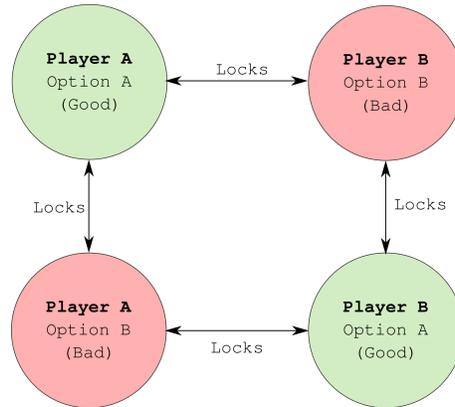


Fig. 1. Locking structure used by the flashbacks in the two-player narrative.

and created a prototype software library for authoring sculptural hypertext using the Typescript programming language. This allowed us to leverage the existing constructs inherent to Typescript such as loops, functions and conditionals, as well as our own existing technical expertise.

The library allows an author to describe a story using the core mechanisms of sculptural hypertext, using pages with guard conditions and functions which modify story-state. This is then compiled into the format accepted by the StoryMINE engine.

With this in place, uncommon patterns can be easily supported by using the existing mechanisms in Typescript for code reuse, such as functions and loops. For example, uncommon patterns can be rapidly generated from an existing implementation by turning the existing code into a function, replacing the instance specific items, such as node content, with parameters. If carefully designed, this also allows for the composition of patterns, defining higher level patterns in terms of other, lower level patterns.

```
function flashback(nodes_for_option_A, nodes_for_option_B) {
  locks(nodes_for_option_A, nodes_for_option_B);
  locks(nodes_for_option_B, nodes_for_option_A);
}

let player_a_option_a = story.NewPage(...);
let player_a_option_b = story.NewPage(...);
let player_b_option_a = story.NewPage(...);
let player_b_option_b = story.NewPage(...);

flashback([player_a_option_a, player_b_option_a],
          [player_a_option_b, player_b_option_b]);
```

Listing 1.1. Typescript code implementing the flashback mechanism described in Section 3.1

Listing 1.1 demonstrates how the flashback mechanism described in section 3.1 can be implemented using our library-based approach. It defines the flashback in terms of the locking pattern [3], stating that visiting any of the nodes for option A locks all of option B, while the opposite is also true.

While this library-based approach clearly offers a great deal of power and flexibility by using a general purpose programming language, it suffers from a high barrier to entry due to the technical expertise required. However, other approaches should be possible. For example, a template-based approach could be adopted, in which a selection of nodes and edges are assigned a name and able to be duplicated, while their content is erased. If templates could then contain other templates, users would be able to create their own hierarchies of uncommon patterns, with a far lower barrier to entry than the programming-based technique we've previously outlined.

5 Conclusion

In this paper we have outlined the idea of uncommon patterns, which are narrative structures unique to an individual story yet repeatedly used within that story. Following this, we outlined some example story designs and identified uncommon patterns present in each of them. We then described a Domain Specific Language (DSL) approach to authoring uncommon patterns in interactive narratives which has the advantage of defining higher-level patterns using other, lower-level patterns. While there are clear technical barriers to using a complex DSL the principle could be supported by simpler systems - for example, by allowing graphical templates to be defined and reused.

By identifying the existence of uncommon patterns and exploring how they can be used to simplify the authoring of novel stories, we hope to encourage the designers of authoring tools to consider how they might be better supported. In turn, we hope this will result in more accessible authoring systems that better encourage the exploration of new and exciting narrative structures.

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