

Toward Analyzing Semantic Structures in Choice-Based Games

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March 12, 2017

1 Abstract

This paper introduces an approach to modeling interactive choice-based narratives that extends David Elson’s Story Intention Graph to address choice-based narratives. The goal is to model key content relationships that may influence important decisions and show the semantic relationship with past content, even without change in how the plot progresses or content is selected. It proposes analyzing an existing non-textual game using tools designed for textual narratives and situates the approach within the goals of the interactive storytelling community.

2 Introduction

The value of a story can be seen as the experience it creates when it is interpreted by a reader. Interactive storytelling uses the capabilities of computational media to broaden the number of possible stories by either branching a story based on player input or dynamically adjusting the story content based on a simulation (as in Prom Week [?]). These narratives can be in any of a variety of immersion levels: text-based were popularized as the genre of interactive fiction, whereas more dramatic interactive stories have been produced including the interactive drama Facade [?].

This paper proposes analyzing commercially available games to better understand why they present compelling narrative choices. The main research question is how to model key narrative relationships between content choices and the experience of a decision.

The paper is organized as follows. We define narrative and narratology, focusing on the Story Intention Graph. We then define cinematic choice-based adventure games and describe why it is suitable. We present a preliminary prototype that allows navigating content, along with a method of attempting to apply a SIG encoding to a choice-based game. We conclude with a description of the planned study and future work.

3 Modeling Branching Narrative

Narrative can be understood as a phenomena that arises from the coordination of inherent mental abilities, including the ability to understand the interaction of agents, their goals, and beliefs and the sequence of causally related events they are involved in. There is a long history of its study in the field of narratology.

Interactive digital narratives represent a possibility space of potential stories which require non-trivial effort to "experience." Espen Aarseth calls these works "ergodic literature" in his book, *Cybertext* [?], drawing attention to the properties that differentiates this medium from other types of literature. Nick Montfort uses the term "traversal" ¹ to describe one possible or actual story that results from engaging with a work. Hartmut Koenitz proposed the term "instance" to describe a parameterized traversal, using the sense prevalent in computer programming [?]. Koenitz describes the space of instances as a "protostory."

The Story Intention Graph (SIG) schemata was developed by David Elson as a set of discourse relations to represent key relationships among concepts present in textual narratives using concepts from narrative theory. It does so through three layers: a textual layer, which contains relevant (but not exhaustive) spans of text from the source textual story. These are connected to a set of propositions and states in a layer that captures the described happenings. Finally, there is an interpretive layer, where propositions are linked to agent goals, plans and values. Elson collected a set of these SIG encodings of a set of Aesop's Fables in order to evaluate the suitability of the schemata for discovering patterns and similarities among different stories that went beyond the surface text. He found that the SIG schemata, even without representing individual propositions, was more successful than alternative methods at identifying similarities in the stories.

We focus our attention on a subgenre of cinematic choice-based adventure games. These games are relatively hand-authored and rely on a series of choices dramatically presented to players. They represent is an opportunity to understand story and interactivity in a genre that can be made constrained so as to be tractable for computational narratology approaches.

This subgenre is an example of a branching narrative, the most common way of reading and executing non-linear stories. There are a number of tools now available to create narratives based on a model of lexia and links, including Ink, Twine, Ren'Py and ChoiceScript. These tools enable authors to create textual or visual narratives with various mechanisms to direct the player along particular paths, or traversals.

¹One recent Telltale Games work, *Minecraft*, uses a sandbox-style creation game based on voxels as its basis, which departs from previous works that use either comics or television. ;

4 Methodology and Problem Analysis

There are two distinct challenges to developing and testing a model for the subgenre of Cinematic choice-based adventure games. First, the media is fundamentally visual and dramatic, whereas the tools designed for both authorship (in the case with Twine and Ink) are textual as well as modeling (Elson’s authoring tool, *Scheharazade* [?]). Second, the chosen model was designed for a linear narrative. The non-textual nature of the media presents a number of obstacles to analysis, including the difficulty in quickly navigate across choice paths while viewing content either within the game engine or on complete recordings.

The first content exploration issue was addressed by creating a web-based content browser that enables a user to change the choice at each points and see the resulting changes in the content.



Figure 1: Story Browser Prototype Interface

The Story Browser Interface shows off two main features:

1. A navigation timeline that shows the location of segments of content, both

raw and traversal-specific.

2. A choice selection interface to specify choices "selected." Selections change the sequence to play content including that result.

The second challenge is by far more important and central to the proposed work. A diagram of the various content segments and their branches is insufficient to understanding how seemingly "unimportant" choices can influence the perception of a character during key decisions. An example: Bigsby can treat Toad two different ways in the opening scene. This causes two distinct content options in a later conversation as a result from this initial choice, but the perception of the relationship is defined by the reactions.

These value-specific changes that converge quickly are exactly the sort of variations that games in the genre are known for, and are poorly modeled by a pure structural approach.

In order to decide on which extensions are necessary to the SIG, we first attempted to reduce the game's media presentation into a textual script with key emotes and descriptions included. We knew that a choice-based authoring tool could capture the variations present in the game, including tracking of certain key choices and the display of optional content in free-roam modes. Ink by InkleStudios (<https://github.com/inkle/ink>) was selected. It was open source, produced a json data file and its source file was human readable and could be annotated within the existing SIG annotation tool, Scheharazade.

5 Future Work

The proposed work will compile a corpus of encodings and evaluate whether the graphs are predictive of which content corresponds to which decision. By better understanding what works using existing tools, we can better understand both how to develop better content, how to understand how existing artifacts create the effects that they do and further anticipate how to create more efficient and powerful authoring tools and systems.

6 References