

Attempting to Model a Commercial Choice-based Cinematic Interactive Narrative using Story Intention Graphs

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ABSTRACT

This paper describes a first effort to model the narrative meaning in a non-trivial contemporary interactive digital narrative. We selected *The Wolf Among Us* as it is a critically acclaimed interactive narrative that defines a genre. The combination of sophisticated narrative and high production values provides numerous opportunities to improve both critical and creative practices in the study of digital narratives. The sub-genre that Telltale Games has defined resides firmly on the playable story side of the ludic-narrative axis of storygames, and provides an ideal starting location for applying narrative models without having to deal with state-space explosion. The game relies primarily on choice menus consisting of natural language with simplistic simulations of state and space. The games experience depends exclusively on bespoke hand authorship of complex characters and on nuanced dramatic performances, representing highly layered meanings and attracting fervent fan communities that are often similar to those that attend film and comics. We used an existing computational model of narrative (David Elson's Story Intention Graph and its text-focused annotation tool, *Scheherazade* [4]) and annotated an adaptation of portions of the work at two levels of granularity: a textual transcription of the content of a single episode and an agent-based interpretation using fan-created plot summaries. The approach of using an existing model of narrative presented significant challenges in terms of adapting the work for encoding, representing meaning and analyzing the results. These difficulties resulted in a set of guidelines for future work and how the model and related software could be improved.

CCS CONCEPTS

• Applied computing → Computer games;

KEYWORDS

computational narratology, story intention graph, interactive digital narratives

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1 INTRODUCTION

Interactive storytelling uses the capabilities of computational media to dynamically assemble stories based on player input and/or on an underlying simulation of a world. These narratives can be in any of a variety of immersion levels: text-based were popularized as the genre of interactive fiction, whereas the interactive drama *Facade* [12] uses conventions from theater and simulates a mimetic illusion of a world where characters act and react as agents with audible natural language in continuous time and space. Regardless of immersion level, narrative is an important vehicle for communicating experiences. The present study uses computational models of narrative to encode a particular storygame, *The Wolf Among Us* by Telltale games. It was selected due to its nuanced narrative and critical acclaim, as well as the thriving fanbase. We hypothesized that the work's intertwining character goals and complicated relationships with each other and the player would provide an ideal testing ground for assessing the value of the techniques on understanding the specific ways in which a specific work negotiated interactivity and choice within a fictional universe and with a defined cast. The goal of this paper is to begin the work of applying formal models to nontrivial works and to embrace the ambiguity, complexity and nuance in the surface and in the attention to the narrative simulation taking place.

This work builds on the ongoing efforts within the computational narratology community, especially those focused on corpuses and formal models. Modern structural approaches such as those taken by many narrative generators owe a debt to the original corpus study of Russian folk tales by Vladimir Propp [15]. Noah Wardrip-Fruin describes computational media in terms of three components: data, process and surface [18]. Works such as Telltale Games relies heavily on the narrative and less on process than simulation intensive works such as the dynamic social practices simulated in Emily Short and Richard Evan's *Versu* [5] or the social games that make up McCoy et al's *Prom Week* [13]. David Elson intended the *Story Intention Graph* to be a descriptive model of meaning, representing the mental simulation that naturally takes place of agents, their pursuit of goals and resulting causally linked events that make up those pursuits.

This paper is organized as follows: First, we define the specific subgenre of cinematic choice-based adventure games and its suitability for applying computational models of narrative. We then review the related efforts in computational narratology and game

studies. Next, we describe in detail the selected methodology of preparing a complex artifact for encoding along with a discussion of the trade-offs made. We then review the results of the encoding effort with a focus on lessons learned. Finally, we discuss direction for future work and conclusions.

1.1 Commercially successful choice-based narrative games

Telltale Game's *The Wolf Among Us* was released in 2013 for multiple platforms. The game received numerous positive critical reviews and represents a mature example of this subgenre. Its story content is conveyed through a combination of dialogue, performance of the characters and cinematography. The game has even been translated into a comic book, the original media that of the *Fables* series on which the game is based [17]. This document locates the work in a subgenre of adventure game, and further places it on two axes.

It is useful to locate the specific space that the subgenre of cinematic choice-based adventure games occupies: where story content is coded to be presented to the player in a very specific order and under very specific conditions and where virtually no unexpected sequence of content occurs.¹ The label "cinematic choice-based adventure game" was chosen not because it is the popular name used for this subgenre of adventure games, which could be considered a hybrid of the point-and-click adventure game and interactive movie, but rather for how it highlights the primary mechanics (making choices) and the primary representational mode (cinematic) as well as including the historical genre of adventure games which is distinguished by distinct authored player-character(s) and an emphasis on story.

The adventure game genre is often put in opposition to genres which promote more player freedom, such as in Massively Multiplayer Role Playing Games (MMORPGs) or Open World RPGs which allow players to create and develop their own character. Clara Fernandez-Vara describes in her dissertation how adventure games shape "the means by which the player restores the behavior that is expected by playing the game" [6]. In other words, in adventure games, the player takes actions that are authored by the game's creator rather than have those actions emerge from the system's behaviors. The player's choices vary the way in which that performance is carried out as well as certain key facts that make up the plot. Most decisions and actions only have an impact on the pacing or variation of the performance rather than ontological changes in the plot, such as the timing for choosing menu options or choosing two options that have the same outcome but which have apparent different descriptive text. Some choices result in content which provides the player satisfaction later in the game, labeled the "payoff" in this document.

The Wolf Among Us is episodic: future episodes must account for selected previous player decisions, although these are usually limited to decisions that have an ontological effect on the world (including the memories of the characters). Episodic storygames have limited replay value due to the amount of content that is necessarily conserved. Other non-episodic games, such as *Heavy Rain*,²

are closely related in their operational logics and their suitability for discovering content relationships using the methods detailed here.

Games in this subgenre conserve content and maximizing narrative payoffs among all possible traversals, this subgenre is ideally suited to annotation using SIG, as the player's goals and intentions are rewarded for small perturbations while the story remains relatively consistent.

2 RELATED WORKS

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 Narratives has traversed many traditional silos, offering both a theoretical challenge to traditional definitions of narratology and complicating the definitions of game with extra-ludic meaning. Game critics have developed theory to describe the effects and goals of study for computational media, including Janet Murray with *Hamlet on the Holodeck* and Noah Wardrip-Fruin's assessment of rhetorical strategies employed in procedural works in *Expressive Processing* [19]. Espen Aarseth attempts to delineate a topology of "ludo-narrative works" and avoids the terms games [2]. He proposes the dimensions of WORLD, OBJECTs, AGENTS and EVENTS as ways of plotting and understanding such works. This locates the subgenre of interest toward the narrative pole, with the typical adventure game treatment of objects but more restrictive use of WORLD and EVENTS.

Locating the work in these dimensions does not provide insight into how to go about critiquing the work's narrative choices in the context of the use of objects or in the presence of multiple possible stories. The concept of a world which has topographical significance is less important than a world which as significance as a signifier. For example, the extent to which Bigby is able to traverse the tenement building and his kitchen is far less significant than the characterization of class they imbue or the desires of the player-character communicated through the affordances of the environment. A character summoned to deal with a disturbance eventually must go upstairs to meet it.

In the field of Computational Narratology, Mark Finlaysen conducted a study of the use of corpuses that observes that text is prioritized given the availability of tools [8], although the only game logs that he cited were those of Orkin in the game *EAT & RUN* [14].

The literature does not, however, provide an example of a corpus of a modern interactive narrative game in a format suitable for annotation, nor does it detail an effort to map an existing model of computational narratives onto a pre-existing long-form interactive digital narrative work.

3 STORY INTENTION GRAPHS

The lack of contemporary narrative games as sources of study is driven home in the proliferation of works that both look at and generate stories of the complexity of Aesop's fables, including the

¹This is influenced by Michael Mateas' concept of "content selection architectures" as a useful way to describe how various types of content and the configuration of the systems that organize them can be compared. [11]

²Quantic Dream, 2010

DramaBank developed as part of the assessment of Elson's annotation tool *Scheherazade* and the Story Intention Graph. Elson sought to validate the SIG's potential for discovering analogies amongst stories and Aesop's fables provided a reasonable length and complexity to do so. Elson includes in the *DramaBank* a single extended work, *Beowulf*, that was encoded by a single annotator, but the limited representation of complexity is one of the goals of the present approach. As Finlayson laments, "it is easier to use [an existing] corpus than build another one." [8]

The Story Intention Graph (SIG) schemata was developed by David Elson as a set of discourse relations to represent key relationships among concepts such as goals, values and agents present in textual narratives using concepts from narrative theory. It consists of 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 as a **timeline layer**. Finally, there is an **interpretive layer**, where propositions are linked to agent goals, plans and values.

Elson 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 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.

4 METHODOLOGY

This section describes the steps taken to conform the work into a format that can be annotated, and to do so in a way that enables additional work to expand that form without having to redo previous work.

The Wolf Among Us has not been subject to this type of analysis, as it is both a commercially available work, it is interactive, and it is not textual. As a result, some of the terminology and methods developed for interactive fiction needs to be expanded to account for the effects that are achieved through the dramatic mode and for the study of existing interactive narratives in a non-textual medium.

The following requirements for an intermediate format emerged:

- (1) It be in a text format, given availability of SIG annotation software
- (2) Accumulate additional traversals without redoing work, allowing comparison different traversals and to associate SIG annotations with the source content rather than the rendered content.

Conducting a rational reconstruction of a game of the size of *The Wolf Among Us* is challenging. The initial approach is reconstruct the logic of a single playthrough as if it were a multi-linear narrative in a scripting language. This has the disadvantage of potentially missing relationships between content. Many times the exact point at which a branch merges with the content from other branches is an indication of a kernel as opposed to a satellite of meaning, using Seymour Chatman's terminology that positions kernels as essential parts of a story and satellites as optional[3].

The highest granularity was applied to the first scene, involving Bigby's first encounter with a Fable, Mr. Toad. In it, the protagonist and viewpoint character, Bigby Wolf, is called to deal with a disturbance by a landlord of a tenement building. After arriving, Bigby discovers the landlord has been disobeying a community rule about concealing his true identity.

The density of the initial scene reflects both the interest of the work as well as its challenge, as the concepts of glamor, class, shame, and justice are all brought into a simple exchange in the first few minutes of the game. The scene revolves around both communicating the nature of the law and the relationship of Mr. Toad to the community as a person requiring a burdensome cost of a "glamour", or an enchanted object that can disguise one Fable as another. This concept is used both to provide plot twists, when a Fable is glamored to appear as one of the primary characters and appears dead, as well as used to drive the active theories present in the fan community about the potential for certain characters to have been glamoured as others at key moments in the story.

After the time-consuming modeling of propositions within the first scene, we decided to heed Elson's results that stated that most of the success in finding analogies occurred with just interpretive layers and that propositions resulted in overlapping meaning and low inter-annotator agreement[4]. Instead we focused on the interpretation layer for the following two granularities. The burden of annotation was described in both Elson's dissertation and Finlayson's survey and it motivated the creation of both *Scheherazade* and Finlayson's *Story Workbench* tool for annotating layers onto textual stories[7].

The next level of granularity was to capture an entire episode using a "natural traversal." This was made possible by existing playthroughs recorded by fans and some by professional streamers. A YouTube video was selected [10] based on its completeness as well as the presence of additional commentary by the player. The creator-performer was Felix Arvid Ulf Kjellberg, better known as "PewDiePie". This playthrough video served as the source for a rational reconstruction of the underlying model in textual format.

Why is it that a transcript would not do? For a single transcription, a single transcript of the events that took place could potentially suffice, including listing choices. However, the next phase will involve recording additional traversal paths and to further delineate relationships of content. Without a model of how the content is rendered, two separate traversals may look too dissimilar to one another to be able to compare, and the annotation task would scale with the number of traversals rather than have some effort conserved with each additional annotation. These and the ability to tabulate various metadata led to a selection of a format that would both serve as a plain-text transcription for the annotation

tool as well as serve as a basis for expanding the transcription to incorporate additional content from other traversal paths.

Inkl released an open source version of their narrative scripting language, *Ink*. *Ink* met all of the criteria, although its exact syntax can vary significantly and thus offers challenges for certain types of annotation. The same language was used in the scripting of 80 days[9].

Inkl provided the following advantages as a representational format to meet the second requirement:

- It is capable of representing simple state variables (whether a certain choice had been visited/selected and conditionals based on that). This is used in the transcription.
 - Provide simple means of applying metadata such as whether a line is dialogue or description, and which character was involved.
 - Simplified notation of converging threads and player choices, used extensively in the logic of this subgenre.
 - Easy-to-read text format source code for using existing SIG modeling tool, *Scheherazade*.

The third level of granularity was applied to the work as a whole, and represents the overall narrative as modeled using the interpretive levels of the Story Intention Graph. A similar approach was applied by a student to *Beowulf*, taking approximately 15 hours. This effort was done using a scene-by-scene summary of the same YouTube series as the second level of granularity. The plot summaries from the fan-maintained Fables Wiki ([1]) had sufficient core story elements for a first encoding and used them as textual sources in the *Scheherazade* tool. One advantage of using the fan-created plot summaries was how alternative paths were explicitly detailed, though this ontological variation introduced its own complications that are detailed in the next section.

5 PRELIMINARY RESULTS

This section describes the initial results of applying the methodology, and documents the problems and insights that arose. There are two main areas where the encoding most benefitted: the delineation of the various "fan theories" as to the ultimate explanation behind the events, and a greater appreciation for the means with which the authors have realized variability while keeping the total amount of content reasonable.

The resulting ink file transcription from the first episode traversal can be found here: http://lucidbard.com/ink/TWAU_001.ink, while the two SIG encodings can be found http://lucidbard.com/ink/TWAU_001.vgl and http://lucidbard.com/ink/TWAU_002.vgl. David Elson's *Scheherazade* v0.33 can be downloaded at <http://www.cs.columbia.edu/~delson/software.shtml>.

5.1 Encoding a Story Intention Graph

When starting out, our first impulse was to encode every possible detail of the dialogue exchanges. This often includes subtlety as in any well written dialogue, using a third topic to communicate feelings and status. One example of these sophisticated exchanges is in the first episode when Bigby encounters Grendel outside of the business office:

GRENDL: What're you-- blind?
GRENDL: What? You don't see there's a line?

GRENDL: I been standing here a half hour already.

GRENDL: You get to just walk in?

GRENDL approaches BIGBY

GRENDL: Must be nice being the Sheriff...

GRENDL: Do whatever the fuck you like.

- I don't have time for this.

- I'm cutting the line.

- [I work here.]

BIGBY: I work here.

GRENDL: And what great work you do, Sheriff.

BIGBY: Hmm... that didn't feel very genuine.

BIGBY goes inside the office while GRENDL looks on as the door shuts behind him.

GRENDL: Fucker...

This exchange is intended to communicate the privilege of the Sheriff, as well as the distinction between the haves and have nots of the community. The literal meaning is quite meaningless – Grendel knows that Bigby is Sheriff, as well as why he can enter the office. But he still wants to air his feelings. It is also difficult to model what is not said, such as in the next segment where Snow White and Bigby spend a significant amount of time working on a murder case without a single word exchanged about those waiting outside. In this case, also, the goal of Grendel is unclear – we don't know why Grendel is at the business office, or why he is trying to antagonize Bigby. David Elson designed the Story Intention Graph encourage a connection from every action to a "core story goal" or value such as ego or health, but in the nuanced and often ambiguous world of *The Wolf Among Us*, such intentions are not even clear after the final curtain.

5.2 Text from Visual

Many times the term text is applied to visual works in to describe the accessibility and the coherence of the work. *The Wolf Among Us* is not the same work in a textual transcript than it is as a mimetic video game. By performing a transcription of the content, including the manner, props, and as much meaning as possible, it became increasingly clear just how large a role performance played in the conveyance of meaning in the work, and how utterly insufficient Story Intention Graphs were to this nonverbal level of meaning.

When Colin gives Bigby a look after being asked to get out of the chair, the underlying motivation is clear. But that motivation is difficult to transcribe, or even to put into words. The familiarity is an emotional state that colors the entirety of the interactions, but the emotion that is present in those moments is not a simple state to be started and stopped in the encoding of Story Intention Graphs.

This difficulty would equally well apply to encoding other non-textual works. A given expression can be a lossy way to communicate, and often times that message isn't required to understand a character's desires or meaning.

One potential solution that we had examined before was to retain all of the non-textual information in the encoded format. This would enable annotators full access to the expressions, the vocal performance and the cinematography of the original. The burden of assembling all of the video traversals, however, is very

large and still requires textual encoding for various natural language tools to be able to act on or assist in the encoding process.

5.3 Interpreting Content in *The Wolf Among Us*

Mawhorter goes into detail on different idioms of choices that covers a broad swath of possible situations. Choice is used in varying aesthetic and functional ways throughout *The Wolf Among Us*. This section describes the various ways that the choices function within the work, informed by the different granularities and the insights gleaned both by the rational reconstruction and encoding.

Several decisions that define Telltale's style also have impact on the choices above and beyond their literal meaning and status as choice as described below. One of them is the fact that most decisions are timed. This provides the player with a limited window of opportunity to make a decision, and also limits the total decision space as a result of requiring the player to read and understand all of the available decisions. Rarely are there more than 4, and more often in critical cases there are only two options. When reviewing a textual version of the work, th

Another decision made by the creators is to strongly signal to the player the results of decisions after them through text. This text is often referred to by the most famous occurrence from Telltale's popular series *The Walking Dead*: "Clementine will remember that". Telltale CEO Kevin Bruner, a keynote at ICIDS 2017, asserts that the text has absolutely no correspondence with any simulation of mental models within the game. Instead, they are purely designed to heighten the illusion of agents considering and reacting to decisions that the player has made. This addresses one of the shortcomings that Mateas and Stern observed in the interactive drama *Facade*[12], where players were unable to track the state of the system through purely naturalistic signals such as expressions and dialogue. The reactions signaled are often more emotional than ontological, whether in terms of representing a damaged relationship with Snow White over brutalizing Mr. Toad or the appreciation for a kind gesture. These responses become their own reward and heighten the already prevalent feedback the game provides to social actions.

5.3.1 Finding Character Between the Choices. Several choice responses provide additional conversation turns where the player-character performs actions after a player-designated choice that are contrary to a player's intention, but which serve to ground the character even in spite of player intentions. An example is in the scene with Collin, when the player is presented with the following choices (in INK format, where each choice is shown preceded by a '-'):

COLIN: I mean, look at your hands.
COLIN: Who'd you get in a fight with?
COLIN: A Fable, right? I'm sure you're not going around punching Mundy's.

- [My job]
BIGBY: I was doing by job, believe it or not.
COLIN: Your job is to beat the shit out of fables?
BIGBY: Sometimes I take them to The Farm.
COLIN: Fuck you.

- [Not my fault]

- [Don't need advice]
- [...]
BIGBY: You think my job is easy?
BIGBY: You try to keep a bunch of Fables from killing each other.
BIGBY: How do you think this all works?

The response expected from Colin's followup to the initial response of "My Job" is much harsher than one would expect, and further reflects a deeper conflict in the protagonist toward his dual role of protector and antagonist.

5.3.2 Goals and Events. The vast majority of speech acts, from a pragmatic perspective, do not differ significantly from choice set to choice set. The narrative as modeled is constructed mostly from the actions of others, and the actions the protagonist, Bigby, takes of his own accord. Marie-Laure Ryan describes two types of immersion that pertain to this type of plot: "emotional immersion" for the sympathy with characters richly described and acted, and "epistemological immersion" for the types of questions that drive a mystery [16]. The game provides a set of clues along the way, but these clues are not gates to a next piece of context. Identifying character goals is not part of the scene where an investigation is conducted in Mr. Toad's apartment. Instead, the entire focus of the player is on uncovering evidence of foul play, and not questioning the motives behind it.

5.3.3 Social Choices. From each episode, between 6 and 8 decisions are tabulated and presented to the player along with their own decision. One example of this is whether the player gave Faith money at the beginning of the episode. The fact that the player gave Faith money only impacts whether the player is able to pay for a drink at the Trip Trap later on in the episode, but most chose to give Faith money. One of the stated reasons that the streamer provided to the anticipated objections of his audience was that if the character asking for money had been a poor man, then the results would not have been the same. This motivation reveals that without knowing why a player made a choice, it is easy to make false assumptions about their play style or their character.

5.3.4 [...] One of the hard fast rules of Telltale games is the omnipresent silent choice. It appears to serve three primary functions within *The Wolf Among Us*:

- (1) Often silence or a non-answer can elicit a more interesting projection on the part of the conversation partner.
- (2) It allows players slop room for making a decision while keeping the narrative going.
- (3) In the case of certain decisions, it allows the player an option to opt out. One example is the decision of who to name as a primary suspect.

Ambiguity is always present in life. In modeling the dialogue choices using Story Intention Graphs, the triple dot silence was the source of the most agony. Not only was the ontological status of the text in question, but the possible motivations varied with every single player. Without a means of specifying multiple motivations that are distinct, the system was unable to represent the null speech act. In one case the silence resulted in a firm insult where the streamer had not intended one. When a choice surprises a player, how is that encoded? Does the player need to have a separate

entity status, apart from the protagonist? And does this even stop at the player – does the authorial goals deserve treatment as a mind reading on the part of the player?

Story Intention Graphs provide a means of mapping out clear intentions of agents and even interpretations of what happened, but one of the fundamental tasks of game design is to anticipate multiple player types and to understand how their motivations interact with the possibilities in front of them. In the Wolf Among Us, violent options are presented regardless of how nice the player has been before, enabling people to change their mind, but also preventing genuine character change.

6 FUTURE WORK

The primary goal of guiding narrative criticism with computational models of narrative is to discover insights that might lie hidden beneath the surface experience, but which underlies authorial decisions. This paper's results motivates the work ahead in creating the datasets to refine both the models of narrative as well as use them in improving the experience of authoring complex, interactive narratives.

Collecting a set of real-world traversals of a single interactive fiction work would enable a variety of studies of emotion and narrative to be done. Telltale has recently described some aspects of its telemetry collection and the fact that the traversals serve as a means of fingerprinting a particular character a player has experienced. In Telltale's first season of *Batman*, this is more overtly described to the player at the end as a set of dimensions on which your choices left a trail.

The next step is to collect additional natural traversals and associated information about "why" decisions were made. These will provide insight into just which aspects of the story were understood and how different players experience even the same sequence of content significantly differently based on their own personalities. Because of the timing and the inability to see everything, we hypothesize that the rationales will be as revealing as modeling the underlying narrative motivations of the characters themselves.

7 CONCLUSION

This paper documents lessons learned from encoding portions of a commercial choice-based narrative using existing computational models designed for text-based narratives. We believe that the availability of sources that can be annotated and studied will open the way for improvements in assessment of narrative experiences as well as improvements in authoring tools designed to support creation of interactive digital narratives..

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