Novella: A Proposition for Game-Based Storytelling

Daniel Green
Creative Technology
Bournemouth University
dgreen@bournemouth.ac.uk

Charlie Hargood
Creative Technology
Bournemouth University
chargood@bournemouth.ac.uk

Fred Charles
Creative Technology
Bournemouth University
fcharles@bournemouth.ac.uk

Alex Jones
Creative Technology
Bournemouth University
ajones3@bournemouth.ac.uk

ABSTRACT

Video game narrative has many complexities that are difficult to capture due to the broad range of interactions the player may have and the numerous presentation methods found within games. While existing models of digital narrative do address interactivity, they do not always address the full breadth of agency available to players in games. We contribute a meta-analysis of select existing models in the context of video games, and present *Novella*, a new game-centric model of narrative intending to capture these difficulties.

CCS CONCEPTS

• **Human-centered computing** → **Hypertext/hypermedia**;

KEYWORDS

Interactive Narrative, Games Design, Machine Readable Narrative, Narrative Modeling

ACM Reference format:
Daniel Green, Charlie Hargood, Fred Charles, and Alex Jones. 2018. Novella: A Proposition for Game-Based Storytelling. In *Proceedings of The 7th International Workshop on Narrative and Hypertext hosted at ACM Hypertext and Social Media, Baltimore, USA, July 2018 (NHT'18),* 5 pages.
DOI: 10.475/123_4

1 INTRODUCTION

As technologies improve, the capability to author increasingly complex stories, and the methods of portrayal of these stories, are increasing within games. Games have evolved to deliver engaging narratives that elicit emotional responses not easily achievable in other mediums. In 2017, Metacritic[1] awarded all but one *Game of the Year* and *Exclusive of the Year* for all major platforms to games with strong narrative experiences. Formalizing and understanding such narratives could aid us in creating even better stories.

Models of interactive narrative are often hypertextual. Locative narrative often uses hypertext nodes and links to represent physical traversal throughout the world to progress and experience a story [14]. Similar approaches have also been used within computational narrative to represent deep data structures that can be used for generative or algorithmic purposes [16]. It is, therefore, possible that video game narrative could be considered from a similar angle - as a form of narrative hypertext. Bernstein's Patterns of Hypertext [2] produced a vocabulary describing structural relationships in hypertexts, mainly in the Web and hypertext fiction of the time. This has inspired similar searches for patterns in digital narrative such as within sculptural hypertext in locative narrative settings [10]. Similarly, models of interactive narrative can draw on previous narratological theories, such as how Aarseth's model [1] partially maps his character stereotypes to that of the classic Aspects of the Novel [9]. This suggests that we too can bring previous works of hypertext and narratology to the realm of video game narrative. This has indeed been attempted, with mixed success, though the broad range of interactive options and presentational mediums (such as environmental storytelling [11]) remains a challenge.

In this paper, we firstly present an application of select hypertext models to two games, and determine their successes and downfalls in representing game narrative. Following, we propose a new game-centric model to work as the basis for a video game narrative authoring framework.

2 RELATED WORK REVIEW AND DISCUSSION

Previous work has attempted to apply conventional models of narrative to game narrative before. Both Brusentsev [6]

NHT'18, Baltimore, USA

DOI: 10.475/123_4

[1] "The Best Videogames of 2017" by Metacritic

and Bostan [5] have tried to apply Propp's traditional functions and archetypes [15] to games, with mixed success. Invariably their approach is linear and demands modification of the original functions.

There have been a number of attempts to build machine readable models of narrative from the hypertext, interactive fiction, and computational narrative research communities. These range from high level models such as those by Zagal [18], to systematic structural models in the Hypertextual work on patterns by Berstein [2] and Hargood [10], and Kim's logical components [13]. There are also models that adopt a more scripting, domain specific approach such as Ursu's work [17], and formal model based attempts such as those of Shoulson [16] and Dang [8].

Some of these models are built with a game centric approach, with a better account for the greater variety of options for player agency, as well as anticipate the many methods of presentation games use. This includes Jenkins review of environmental storytelling [11], Bizzochi's "more modest framework" [4], Aarseth's constituents [1], and Chauvin's emergent narrative model [7]. However, all of these fall short of addressing a general game narrative representation, focusing on individual aspects (such as Jenkins or Chauvin) or only taking a conceptual high level view of the story in a way that lacks detail (such as Bizzochi or Aarseth). This does not offer a fully machine readable model of game narrative.

Existing Model Suitability Review

In order to better understand the accordances and constraints of existing models within the context of game narrative, we applied four models to *The Stanley Parable*[2], which features a heavily complex and interwoven narrative, and to *Portal*[3], which is comparatively linear but with a range of presentational techniques. These two games represent two key challenges in the space: range of player agency, and range of presentational options.

We firstly played through both games, keeping logs of each scene, narrative entity, and potential divergence to build a workable set of annotations for each game. Portal was broken up into two acts - the first containing nine chapters for the test chambers, and the second containing the escape sequence of three chapters. The Stanley Parable was graphed as individual pathways for each ending, with choices being highlighted representing branches.

Propp. We applied the breakdown and character archetypes of Brusentsev [6], followed by mapping out the stories using the modified function and rule sets of Bostan [5]. Each chapter of Portal had its functions listed in their order of occurrence, which ,when mapped out, gave an adequate overview of the overall plot. Using this mapping, we were able to identify that in act two, both chapter one and two ended with a sequence of functions 5/6/32/43, which matches the plot well. However, we found a lack of support for characters transitioning between archetypes, such as how GLaDOS goes from helper to villain. The Stanley Parable's function graphing likewise showed an accurate plot summary of each pathway, clearly showing the branches and how routes interlink. Some characters, such as Mariella or Stanley's third-person self, did not map well to the archetypes.

Aarseth. Using the breakdown methods for each category described by Aarseth [1], we found that when the elements were combined an idea of the *type* of narrative experience the game provided was discernible. Character and object types are perhaps a little too interpretive sometimes making assignment difficult. Portal's Personality Spheres are named with unique personalities, but are not deep. It's likely that more options would have to be added and existing ones refined. The kernels and satellites in particular highlighted the level of agency the game provided, and could have been explored in greater detail to be of more use.

CANVAS. We took the formal definitions of the elements of narrative from Kapadia [12]. Both games were broken down into their constituents and modeled firstly with interactivity in mind, but it became quickly apparent that this model did not handle agency or choice in any form. Alternatively, the games were modeled using a single play session (i.e. choices were predefined and interaction removed), to which the model successfully represented the narrative well, all be it in a linear form of a single instance of play.

Bernstein. We took the hypertext patterns of Bernstein [2] and identified at least one example of occurrences of the patterns in both games where applicable. We found that Portal had few examples of the patterns, perhaps due to its narrative linearity. Although arguably the environmental aspects could be seen as a variant on Bernstein's montage. On the other hand, The Stanley Parable had plentiful examples of even complex patterns, most likely due to its interwoven narrative pathways and heavy reliance upon user choice and agency over the narrative. It is worth noting however that this model gives much in terms of a lens to consider structure, it is content neutral with regards to the nodes themselves.

Findings and Discussion

Propp. Using Propp's functions to map out a story provides a great overview of what happens, and using a modified ruleset, can show patterns and interlinking pathways, but cannot represent any greater levels of detail. Using a less restricted set of function rules allows for detection of sequences that appear frequently in the narrative. Propp's functions are generally simplified from their original Russian form, and some

[2]The Stanley Parable, Galactic Cafe, 2013
[3]Portal, Valve Corporation, 2007

meaning is lost in translation [15]. Their application to scenarios other than folktales becomes somewhat interpretive. The function set has been extended for game-specific scenarios, but still requires refinement to capture game narrative with clarity.

Aarseth. Event significance, object and character malleability, and types of worlds make for great overviews of the *type* of narrative a game contains. Portal is a Linear Corridor, with all but Inventible objects, containing all character types, and having a plotted kernel-based narrative with a few dynamic satellites. However, this model is unable to represent the narrative at a greater level of detail. Events are defined by their significance to alter the narrative, but do not describe what happens in the event itself. The contents of such events could come from a more detail-oriented approach.

CANVAS. This model provides a level of detail allowing for the description of almost any static narrative. Unfortunately those situations must be predetermined and cannot include any form of branching or player agency. Inserting interactivity into the model could be a possible way forward.

Bernstein. Identifying and presenting structural patterns to authors enables them to be more aware and understanding of how their narrative experiences are constructed. Visualizing a tangle's web of options could make it more maintainable, for example. When applied on its own to narrative, this model, by design, focuses on how events relate to one another in a structural sense. Individual event details themselves are not defined, and as such we cannot derive what actually happened, but instead the relationship between the surrounding narrative. This is to be expected given the work is an observation of structural patterns, rather than concerned with the content of given nodes.

To conclude. The models reviewed are far from a complete listing, but we can still deduct observations between those included. It is difficult to model the player's alteration on the narrative through various means of interaction. For instance, the ability to interrupt and alter the course of cutscenes in Mass Effect[4] with the Paragon/Renegade quicktime events. Stochastic narrative elements appear to be difficult to capture also. In The Stanley Parable's initial sequence, for instance, the phone will randomly ring and with a random phone call, of which one alters the actual experienced narrative. Another problematic area is the inclusion of emotion and tone in which discourse is delivered; that a sentence is sarcastic or genuine can drastically alter the perceived narrative. Sequences of narrative triggered by conditions are also difficult to represent. In Portal, for instance, the player receives a unique set of dialog interactions if and only if they manage to trap themselves within the 13th chamber. Parts of narrative that can be found within the world optionally are also not covered, such as observing an overheard conversation, finding a narratively-stimulating book, and so on.

[4]Mass Effect, BioWare, 2007

3 PROPOSED MODEL

Our model is game-centric, taking into account the difficulties encountered when dealing with game narrative.

Novella stories model both the content and structure of the narrative. Entities within the narrative such as characters, items, and places are modeled as well as the scenes which deliver the narrative. `Entities` are represented by names, descriptions, and a tagging system used for classification. Story structure however is modeled by a series of `FlowNodes` organized as `FlowGraphs` - each node determining the content of a particular scene being delivered and graphs the structure of those nodes. A central `Story` object will track the state of the narrative through a collection of variables that are readable and writable by the story engine that operates the players movement through the narrative (and consequently through the flow graphs). Figure 1 shows the overall structure of *Novella*.

The story object holds a collection of flow graphs and a reference to the graph that the story starts with - this is important as the non-linear stories delivered by games may not just require branching within their plots but also open explorations which means our model must support parallel threads of narrative simultaneously. Each graph is made up of nodes, links, and listeners - nodes representing story content, links the flow from one node to another, and listeners triggering new threads of narrative should certain circumstances be satisfied. Each link is made up of `Conditions` (checking the state through the story's variables for the legitimacy of a given narrative option at a given time), a `Transfer` (which connects the link to new node), and `Functions` (which change the story's state on a link being followed). This part of our model is similar to other calligraphic hypertext systems [3] in that it is made up of content, links, guard fields, and a general state machine model. The novelty in our approach lies in combining this with a game centric content model within the flow nodes themselves.

FlowNodes represent individual narrative fragments. There are varying types of FlowNode to better deal with particular narrative elements, but all share a name and synopsis.

Context nodes describe what is happening in the *now*, providing setting for the narrative. Without Context, discourse and other narrative actions can become disconnected and difficult to interpret. A Context's synopsis describes the scenario. It also houses a set of GameplayRules as well as a collection of Discoverable Narrative items. GameplayRules define the level of control and agency available to the player, which is used in temporary suspension or alteration of regular player ability. This GameplayRules object can be used to

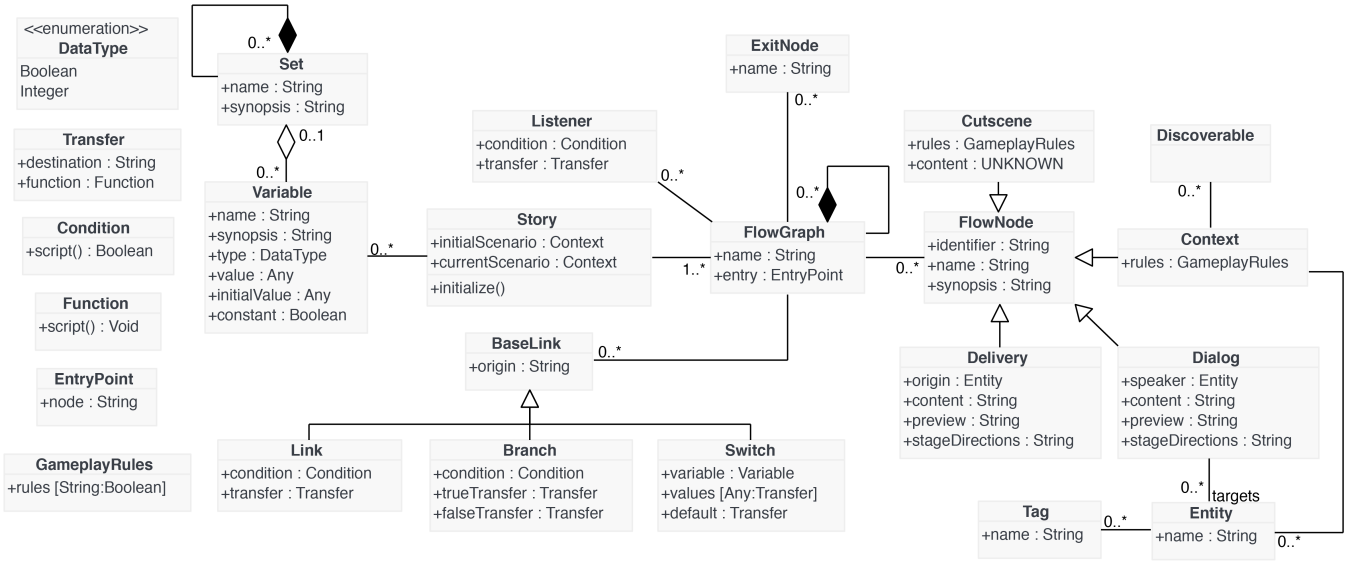

Figure 1: Novella UML diagram showing objects, attributtes, and relationships.

define changes in the play of the game (such as mini games) as well as the variety of interactivity available at the juncture of the game. This could be represented by something as simple as a boolean list of rules on/off but the full scale of this part of the model is outside the scope of this proposal.

Dialog nodes represent discourse between two Entities. Dialog consists of a speaker Entity, a collection of target Entities, a transcription of the delivered text, and any necessary stage directions as to how the delivery should be made. Entities can speak to themselves by being both the speaker and target. Entities can speak into the void by having no target.

Delivery nodes represent the presentation of narrative information from the game to the player. They reference an Entity from which the content is being originating, a description of the content being presented, and any necessary stage directions as for how the content should be delivered.

Cutscene nodes represent any narrative sequence with temporary suspension or alteration to agency. FMVs for instance, completely restrict control for their duration, and scripted events may temporarily limit control to show something specific. A synopsis describes the scene, and the restrictions are enforced with associated GameplayRules.

Discoverable narrative items are elements of narrative that can be found or experienced within the game. They are represented as an amalgam of a four-dimensional narrative matrix, which when combined define the narrative text and its place in the game. *Tangibility* defines physical presence. A `Tangible` element has a physical representation within the game, such as a weapon or collectible book. `Intangible` elements have no such representation, such as a codex entry. *Functionality* declares the core purpose of the text, or the element it accompanies. `Narrative` elements exist purely to enrich the story, such as a piece of graffiti. `Mechanical` elements have some other core purpose other than narrative, such as an item description accompanying a weapon. *Clarity* expresses whether texts are either `Explicit` and defined, or `Implicit` and abstract or interpretive. *Delivery* defines how the text is consumed. `Active` texts require conscious interaction in order to be consumed, such as picking up a note to read it. `Passive` texts exist regardless of player interaction, and require to be either observed or experienced in order to consume, such as reading a poster or overhearing a conversation, respectively. Combining these four dimensions together can represent discoverable and abstract narrative elements within a game. Item descriptions as in Dark Souls[5] are `Tangible` as their associated object has a physical in-game representation, `Mechanical` as their associated object's core purpose is not narrative, `Explicit` as they are defined, and `Active` as they require interaction to be consumed. Codex entries as in Mass Effect are `Intangible` as they have no physical in-game representation, `Narrative` as their core purpose is storytelling, `Explicit` as they are defined, and `Active` as they must be interacted with to be consumed. Overheard conversations as in Skyrim[6] are `Intangible` as they don't have a physical representation, either `Mechanical` or `Narrative` depending on the conversation (some can grant the player quests, arguably having a core purpose other than narrative), `Explicit` as their content has definition, and `Passive` as

[5]Dark Souls, From Software, 2011
[6]The Elder Scrolls V: Skyrim, Bethesda Game Studios, 2011

the conversation would hypothetically exist regardless and only require observation to be consumed.

Simple Example Figure 2 presents a worked example from Life is Strange[7] demonstrating concepts from our model. **C** and **D** are `Context` and `Dialog` nodes respectively. We start by setting the context of the scene. This is followed by three choices the player is able to pick from. The middle choice's link, represented by a red arrow, is only available if the player chose to stay hidden in a previous sequence, which we can represent as a `Condition` of the link. Following the third choice, there is one of two potential dialogs presented based on a previous encounter's outcome, represented by the green arrows. This illustrates the use of a `Branch` link in our model. All three choices then join together, followed by a set of parallel options, which likewise resolve to continue the narrative.

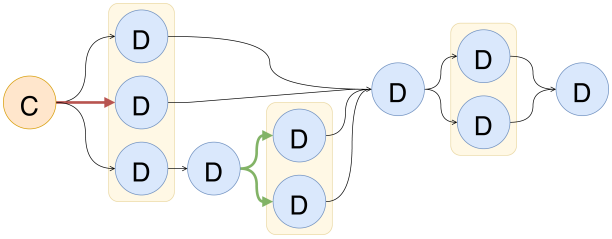

Figure 2: Discourse between Max and Joyce in Life is Strange.

4 CONCLUSIONS AND FUTURE WORK

In this paper we have presented *Novella*, a game-centric model of interactive narrative that is able to capture complex elements such as discoverable texts and interruptible sequences. Following our first analysis of a select set of narrative models in the context of video games, we concluded that while non-game models are applicable, they lack the ability to properly cover the complexities of game narrative, and that game-centric models are tackling the correct problems, but show gaps in their ability to fully express a game narrative. We intend to continue refining Novella through further analysis and application to existing texts. We also intend to implement *Novella* in a complimentary authoring and reading environment suitable for video game narrative development. Key areas of improvement include defining `Cutscene` content and providing a data representation of `Discoverable` narrative elements.

[7] Life Is Strange, Dontnod Entertainment, 2015

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