

# Collaborative Procedurally Elaborated Storytelling

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## ABSTRACT

Our imaginations are capable of a rich and varied set of possibilities, not all of which can be represented currently by narrative game systems. If the content for those systems need not be authored ahead of time, and instead can be drawn from a human storyteller and incorporated into gameplay, we can learn which capabilities they bring to bear contribute the most to the player's experience. This proposed system will provide a set of specific, context-sensitive decisions to the human storyteller that have before been coded into the logic. This study should yield validation and insights for current AI research goals including dynamic story creation, autonomous characters and various social and dramatic simulations and planners. The ultimate goal of this system's design is to improve the experience of narrative, the player's sense of autonomy and agency and anticipate input that current systems cannot yet accurately interpret or represent.

Currently the narrative world in computer games is represented, by necessity, entirely in the system. This limitation creates gaps between the player's affordances and what the system can respond to and produce. This system relaxes the constraint that all content must be authored ahead of time allows us to affect the shape of the experience, by empowering players to make key decisions interpreted through a system that handles representing the evolving narrative and social dynamics of the characters. This allows the narrative system to make decisions based more on higher-order goals such as flow and interest. Game design and future systems will benefit from insights into how players respond to a system capable of advanced planning, emotional understanding and creative improvisation, through using human-level intelligence and presence.

## Categories and Subject Descriptors

K.8.0 [Personal Computing]: General – Games

## General Terms

Design.

## Keywords

Procedural Content Generation, Story-based game design, Collaborative Asymmetric Gameplay

## 1. INTRODUCTION

As Scott McCloud described in his seminal work on sequential visual narratives, *Understanding Comics*, "All media of

communication are a by-product of our sad inability to communicate directly from mind to mind." Narrative is one bridge for satisfying our desire to cross that gap. Stories that incorporate a dramatic arc and plot enable us to communicate how we feel using the constructions of characters, events and even rules. Interactive story games take that level of communication a step further, extending the use of art and language to include procedures and simulations which can serve the goal of communicating an experience. This paper focuses on games where narrative is essential to the player's experience. Cavazza and Pizzi review the fundamental representations present in interactive storytelling, including the diversity of how systems both treat plot and character's psychologies. Despite such research, narrative games, RPGs in particular, tend toward a certain pattern of player agency and expression [2]. Players get to express themselves through choice in quest, identity of their character and the sequence of exploration of the world. Marie-Laure Ryan discusses the impact of this agency as the "ontological center," one which modern roleplaying games are limited in their capacity to allow players to change [8].

Many computer RPGs follow a fairly logical structure of advancement and progression through questions which acquaint a player with the world and the characters and conflicts that inhabit it. One different goal is the concept from Star Trek later investigated by Janet Murray's *Hamlet on the Holodeck*: a guided narrative experience which emulates reality as closely as possible while allowing a person to experience relationships, events and possibilities that have the same satisfying connections as novels or films, but with much more personal involvement and a heightened sense of agency.

The distance between modern roleplaying games and the concept of the Holodeck extends beyond mere representational form, but extends to the system's ability to understand and properly respond to player's actions and desires. There have been works that have push at this problem of pre-authored content versus agency in a narrative context. For example *Façade* became the world's first interactive drama, centered on a couple having relationship issues and using a system to both intelligently address the player's freeform text input and to fluidly advance the plot in a way that invokes the Aristotelian arc [5].

Mateas and Stern's creation and the scholarship surrounding it provide much of the inspiration and framework for the hybrid approach that my research will pursue. One of the hardest outstanding problems of procedural authorship is creating content which allows the player a full sense of agency, including the complexity of creating dynamic systems such as the one behind *Façade*. The interactive drama addresses the problem in part by limiting player input to a fixed character count in free-form text, which can be parsed for keywords. Context-sensitive grammar remains an unsolved problem in natural language processing. The problem involves understanding not just the denotative content of player's words, but their context, connotation and expressive purpose. This system will respond to how characters feel about the player's actions or each other using the procedural animations

and selection of dialogue acts that appropriately advance the story and respond satisfyingly to the player's input [4, 9].

Mateas' approach to complex narrative systems is to "build [a] system to understand it." That approach can be generalized to the *experience* the system produces, even by altering the parameters of the system, such as by allowing a human's input to do more than merely resort to a "Wizard of Oz" setup where a human stands in for components that will eventually be designed to handle the task. The desired experience of the system proposed is one of communication through narrative, where the details of representation and the range of choices are chosen to incorporate unexpected situations and tailored to the goals of managing pace, plot and flow.

One of the fundamental divides between games such as *Dungeons and Dragons* and *World of Warcraft* is where the medium of the experience resides and where the player's focus primarily resides. The confluence of both a difficult set of problems and the availability of technology to enable new social gameplay experiences motivates the proposed research project. The core concept (and system) of a procedurally elaborated template is to apply recent advances in procedurally generated content with the guidance and social sophistication of *Comme il Faut* engine developed by McCoy et al [6] and included in *Prom Week* [7] as well as the story-based GrailGM framework developed by Sullivan and used in *Mismanor* [10, 11]. This system should provide both the right level of authorial leverage in a format that will be compatible with future innovations.

## 2. GOALS

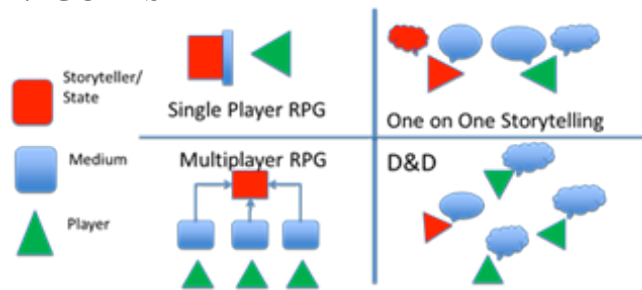


Figure 1 Configurations for Narrative Games

These effects are partially controlled by the system's similarity to one where an AI-based system (*Comme il Faut*) makes decisions using simulation and its own deterministic measures, as well as by allowing both systems to use (largely) the same data and display. This raises several questions:

1. How does having an narrative director, specifically a player, that can sense disinterest or emotion and correctly interpret it affect player experience? This may show through:
  - a. Story consistency
  - b. Challenge level
  - c. Enjoyment.
  - d. Flow.
2. Does having the director visible and in the same physical space affect connection, emotional involvement with the material and/or interest level?

The proposed system will be tested to make sure that the input system itself is equivalent in ease of use when compared to a system that uses windows, icons, mouse and pointer. This can be

tested by using the input system to compare basic tasks such as selecting options, finding targets and comparable studies similar to the ones conducted by M. Billinghurst [1].

The final study will provide insight into which current ventures in AI would have the most impact when human-level intelligence is substituted. The procedurally elaborated template theory developed in the course of this research program would likewise be usable for AI systems that would take on the role that humans play.

## 3. APPROACH

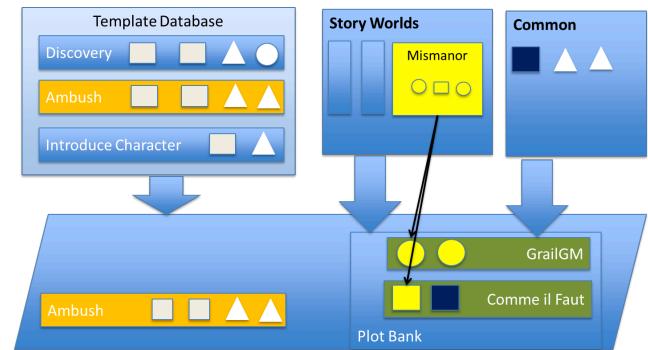


Figure 2 Procedurally Elaborated Templates

The system proposed relaxes the traditional constraints of requiring content to be authored ahead of time by a system, and focuses on a scenario where two or more players sit around a marked table. One player is the storyteller, able to access to not only the current state but the next possible plot points and a variety of mix-ins that could be triggered at any time. The storyteller also has the ability to modify or adapt existing assets (character stats, models and stored events) to use in an unforeseen way – for instance, adding background information to a character as it becomes relevant or removing or locking doors in the map to coerce players to move in a given direction.

The story world will be a microcosm experience where the storyteller can add additional threads and plots as the player experiences it. These can be later generalized into the system for future sessions by using the templating system used in *Prom Week*.

The primary levers that the author would have under their control are the values that change based on the player's response. These values should take into account not just the player's choice in the interface but their intentions and emotional state. The current design involves a player making the choice of a discourse intention (a social game, which has a predictable *intended* outcome in the eyes of the actor) and an emotional state and intensity with which to deliver it. These are then interpreted by the system into a template that plays out in sequence. The storyteller has the opportunity to change the nature of the interaction or the effects inside the system. The affordances given to the storyteller include the exact numbers the systems to incorporate into the results of the social game, the possible follow up plot elements. If the player's intention is not currently represented by the library of options, then the storyteller can author a response on the fly, speaking for the character by typing in text in the manner of *Sleep is Death* by Ja Rohrer. The primary difference between the model of storytelling used in *Sleep is Death* and the proposed system is the degree to which the system understands and can author the details in absence of the storyteller's input. The Storyteller can

focus on either broad changes to the narrative arc or they can micromanage an individual interaction with the player.

An example of such an interaction would include the player initiating a conversation with a character in the story. The player would have a number of options of intent, such as asking about an item in the room or a plot item that their character knows about. They would further have the option to invoke either a piece of information that they have in their possession, such as a relationship or fact, or the emotion and manner in which their act is carried out. The storyteller would observe the system's interpretation as well as the result of that interaction, changing the result if it doesn't match what makes the most sense. They can also trigger interjections, as from other characters or from the world itself. Instead of removing a player's agency the storyteller can invoke other characters to result in change in the circumstances.

The player(s) can interact at will—solving problems by conversing or resorting to violence. The results of each of these decisions are recorded in the game state and can be used to suggest additional choices to the storyteller. Because both conversation and combat are handled, the storyteller can change the game's pacing by skipping plot points or creating new responses.

## 5. CONCLUSION

Understanding the player and responding to the player's decisions remains an ongoing problem in games that capture the imagination. Navigating physical spaces and puzzles which capture such intentions have made great strides while the dimensions of social and emotional feedback have not been as successful. While advances in graphics and innovations in gameplay have pushed the gaming industry forward, their potential as a vehicle for narratives has not had a similar leap in expressiveness. The obstacles to designing AI systems that tell stories with an awareness of player's interest and contributions are numerous and correlate with some of the largest problems in AI: natural language generation, natural language understanding, cultural and social awareness.

Experiments surrounding these games will answer some of the more fundamental questions for which research systems have not yet been created, and which may prove to be an enjoyable game format for emerging technologies such as the second screen provided by the iPad, Wii U and even augmented reality.

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