An Out-of-Character Approach to Emergent Game Narratives

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ABSTRACT

This paper is a first step toward the exploration and further development of the narrative possibilities offered by emergent games. First, we present the five characteristics of emergent narratives that we believe to be fundamental: coherence, agency, possibility space, uncertainty and co-authoring. Then, we investigate the presence of these characteristics in various academic experiments. Finally, we describe a novel approach that provides players with high level actions that they can perform in order to manipulate the story in real time.

Categories and Subject Descriptors

I.6.8 [**Simulation and Modeling**]: Types of Simulation—*gaming*; K.8.0 [**Personal Computing**]: General—*games*

General Terms

Theory, Design

Keywords

Emergent narrative, Minecraft, emergent game, computer science, out-of-character

1. INTRODUCTION

Emergent games form a specific genre that has recently gained certain commercial and critical success, mainly thanks to the survival and construction game *Minecraft*. This success was unforeseen and paved the way for many more successful emergent games [9, 17, 7, 6, 20]. These games provide emergent gameplay: they have been created with a specific kind of approach to game design that emphasizes the creation of rule-based systems rather than pre-scripted paths [22].

Emergent games can indeed be considered as the opposite of scripted or linear games. On the one hand, emergent games tend to provide global, consistent rules that can be combined in multiple ways. From these combinations emerge many new situations that even designers sometimes find hard to predict. On the other hand, scripted games use very specific rules that are not intended to be combined but instead lead to accurately predefined situations. Authors of emergent games have thus less control over the sequence of events in their games than authors of scripted games: they favor combination over control.

This lack of control over the sequence of events means that the author cannot precisely design the specific story that players will experience within an emergent game. This may lead us to think that it would be difficult to consider emergent games as narrative games. If we consider, however, that players take part in the game's story creation and express themselves through their choices, then emergent games allow each play session to become a player-driven narrative [11]. We consider that this kind of narrative is a major aspect of emergent games and has greatly contributed to their recent success.

To our knowledge, little research has been carried out in the field of emergent narrative [4, 1, 21]. In this paper, we intend to go a step further by providing: 1) a set of the characteristics we consider fundamental in emergent narrative games; 2) the first iteration of a model that can provide stronger emergent narratives through the reinforcement of these characteristics.

In the first part of this article, we thus describe why emergent narrative games provide players with coherence, agency, a possibility space, uncertainty and co-authoring. Then, we propose a model that provides a way for players to act "out-of-character" when desired; that is to say, the player can momentarily pause their role as player character in order to

trigger high-level actions, deeply altering the story in real time. This approach borrows from the improvised play style of children, in which they do not follow a predetermined script and are able to easily add new characters, imaginary objects or places in order to author the story that they also experience as players [19].

2. EMERGENT NARRATIVE

Emergent games possess specific characteristics that allow the emergence of particular narratives through player interaction. We named these characteristics coherence, agency, possibility space, uncertainty and co-authoring. We believe that they are fundamental to emergent narrative games and clearly describe the specific qualities of emergent narrative. The model that we propose at the end of this paper is based on these five characteristics and seeks to explore and enrich them.

2.1 Coherence

Emergent games feature worlds built not only for the player to see but also as simulations of alternative realities. Such worlds are autonomous and allow many situations to emerge; they do not impose a specific story. Each entity in the world behaves according to consistent rules as well as according to the player's behavior. In this way, emergent games tend to stay coherent and provide more believable worlds. As a basic example: in an emergent game a door will behave in a consistent fashion - it can always be opened. However, in a linear game it is common to have only specific doors being openable; while others are simply textures, not meant to be opened, thus guiding the player but resulting in a feeling of inconsistency.

A related concept, persistence, refers to the ability of a game to simulate its world and entities in a consistent fashion. That is to say, every modification of the world or its entities will be permanent. As such, persistence increases the coherence of the game as a whole.

Finally, the concept of ludonarrative dissonance extends the notion of coherence to the possible contradictions between the game's narrative intentions and its actual gameplay [8]. Sometimes the game leads players to act against the logic of the narrative. In an emergent game, however, there is no imposed course of action, in that players are given more responsibilities and freedom to experience the game as they desire. This drastically reduces ludonarrative dissonance.

2.2 Agency

Agency is a fundamental concept for understanding the pleasure that games can provide. It represents the experience of a player having an impact in a dynamic, responsive world [15]. Strongly coherent worlds of emergent games lead players toward a better understanding of the inner mechanisms of the worlds they are immersed in. The more they play a game, the easier it becomes for them to anticipate its global behavior. Hence, as in real life, players are more able to anticipate the consequences of their actions. This helps players better plan their impact on the game and provides them with more agency.

2.3 Possibility Space

Possibility space represents the set of game states that can be attained through play. It is an important characteristic of games in general and tends to vary depending on the way a given game is structured. Emergent games simulate complex and persistent worlds by way of many interrelated subsystems to create large possibility spaces. As such, an emergent game can be replayed many times while still providing players with new worthwhile situations and choices. For instance, Go is a game that has been played for centuries and yet it still provides new unique matches. Even without accounting for its multiplayer aspect, Go has an extremely large space of possibilities that takes a player a long time to explore.

The existence of this large space of possibilities implies that players rarely find themselves in frustrating situations, as they are always able to explore the space in search of new scenarios. As a result, emergent games more easily allow the possibility for dramatic actions that greatly impact the course of the game. For instance, permanent death is a game feature that obliges the player to restart from the beginning of the game every time his or her character dies. Permanent death helps players focus on moment-to-moment decisions, which tends to increase tension and imbues the performance of playing the game with narrative weight [10]. Thanks to the large space of possibilities, while players will feel a sense of loss they can restart the game to experience a whole new narrative - whereas in a scripted, linear game, a complete restart of the game may prove very frustrating.

2.4 Uncertainty

The need for uncertainty in games is crucial for creating challenge; it means that actions taken by players can either succeed or not, and it leads players to strive for success [18]. Uncertainty, however, is even more important in emergent games. In these games we find uncertainty not merely in terms of challenge outcomes but also uncertainty more broadly in terms of scenarios that are hard to predict. The large space of possibilities as well as world persistence create the potential for chain reactions that lead to the emergence of unexpected situations.

Of course, the more a game is played, the more its possibility space is explored and the more players anticipate the behavior of the game. As such, the feeling of agency is greater for players who have an extensive experience of a particular game. Still, a sufficiently complex game can provide uncertainty even for an experienced player; it can be impossible for players to monitor every action taken by each entity of the game world. This brings a strong element of surprise that forms part of the enjoyment provided by emergent games, each play session containing its fair share of unexpected.

2.5 Co-authoring

In emergent games the player is responsible for the story and the direction it takes. Authors do not intervene or impose mandatory events; rather, they build a constrained space in which players are free to come and go as they please. We use the term "co-authoring" to express the notion that both authors and players are responsible for the final experience. And yet, they fulfill two very distinct roles; there is no conflict between the narrative imposed by authors and the narrative expressed by players. This is a radically different approach as compared with linear narrative approaches. In a very real sense, it empowers players to become authors of their own virtual reality.

This concept of co-authoring also serves to shed light on what could be considered to be the major limitation of emergent narrative games: the player is *required* to be an author, or else she may experience a somewhat undirected, boring narrative. We therefore suggest that emergent narrative games target a specific audience of players who can assume the roles of both player and director, maintaining suspended disbelief while experiencing situations they have themselves provoked.

3. INTERACTIVE NARRATIVE

Interactive narrative is the field of study that focuses on the creation of stories in which the audience can modify the course of action [23]. In this section we analyze existing research in interactive narrative and compare the various approaches to the one we propose in this paper.

Recent advances in artificial intelligence have progressively allowed computer games to include increasingly more complex characters with particular behaviors and desires. Some research has taken advantage of such advances to create more complex and interesting experiences.

On the one hand, some of this work makes use of a specific narrative logic to ensure that the stories created respect certain authored conditions [12, 13, 24, 16, 3, 5]. Such a narrative logic can be expressed through a "drama manager" capable of altering the environment and characters or even limiting the player's interaction in real time [12, 13, 24, 16, 5]. It is, however, also possible to apply a narrative logic through a decentralized drama manager. Each agent is then able to make decisions regarding the unfolding story instead of reacting only through its simulated human mechanisms [16]. This approach to interactive narrative allows authors to have more control over the course of events but it limits the number of possible stories and reduces player agency.

On the other hand, other research proposes a strong emergent approach where the story is not managed in real time [4, 1, 14]. The autonomous characters in these experiments act according to their simulated human mechanisms and not through an external narrative logic. This approach tends to consider that the narrative is driven by players - granting them more agency - and allows for more possible stories. Yet it also limits the author's control over the narrative and can potentially generate unsatisfying stories. It is, however, important to note that in one of these experiments (FearNot!) the architecture driving the autonomous actors was later improved with a double appraisal feature similar to a decentralized drama manager [2].

Our approach is naturally closer to the more emergent experiments but we intend to extend the possibilities of emergent narrative by exploiting and improving upon the fundamental characteristics (coherence, agency, possibility space, uncertainty and co-authoring) that we presented in the previous section.

The challenge of narrative interest, partially answered by the use of drama management techniques, is very present in the case of emergent games since many possible states do not necessary lead to interesting stories. This is the reason why we are proposing a model emphasizing the co-authoring potential offered by emergent games. Indeed, our model provides players with high-level actions for the manipulation of the story in real time in an out-of-character fashion.

4. EXPANDING EMERGENT NARRATIVE

4.1 Intentions

In order to extend the narrative possibilities of emergent games, we propose a model that allows players to trigger processes capable of provoking the emergence of new game states in real time. This is a player-driven and out-of-character approach inspired by children's improvised play style: children build the story as they play and regularly step outside of their assumed characters in order to redirect and specify certain elements of the story [19]. Our goal is to allow video game players to build and experience such stories through the use of out-of-character actions.

These processes are able to adapt and generate coherent situations according to the current and previous game states. They make it possible for players to easily modify the current story at runtime while still producing emergent and surprising situations. Indeed, players cannot entirely anticipate the way a given process is going to adapt to the current state of the world and are even less likely to anticipate the impact of the process on every entity of the world.

The specific player-driven approach to game stories that we take here empowers players with out-of-character actions and allows the study of players' enjoyment of emergent narratives. This is intended to avoid the potentially unsatisfying stories that emergent games can produce and also attempts to maximize the benefits provided by the characteristics of emergent games that we listed above. Furthermore, this model could be adapted to be used by a game master in a multiplayer environment or even automated using a planning algorithm.

4.2 Model

Practical implementation of the model proposed requires the development of three components capable of:

- Recording the important events in real time in order to form the past and present of the story.
- Providing players with out-of-character actions that modify the story in an emergent and coherent fashion by adapting to the current state of the story.
- Allowing the creation of new out-of-character actions using a proprietary scripting language.

As our test-bed we have chosen the very popular construction game Minecraft with a view to benefiting from its emergent gameplay and large community of players.

4.2.1 Story

To ensure that the adaptive processes act according to the state of the story, the model needs to take into account the story's past and present events. In a linear narrative game the story is already encoded; it drives the game and the players. In an emergent game, however, the story is driven by players and, as such, needs to be recorded. In order to do so, we will save players' encounters, objects, places visited, enemies and so on to a database. This data represents the story to date and is used to inform our adaptive processes.

4.2.2 High-level Processes

The functionality provided by our suite of adaptive, high-level story-modification processes enables players to alter a

game's story in real time, while adapting to, and exploring possibilities deriving from, the current story state. Our goal is to ensure the coherence of the game while at the same time to provide deep story modifiers. For example: a player decides that they want an accomplice to help them. Once the corresponding process has been triggered it selects an NPC and updates it with the necessary data. The selected companion could be human or animal or even a former enemy of the player.

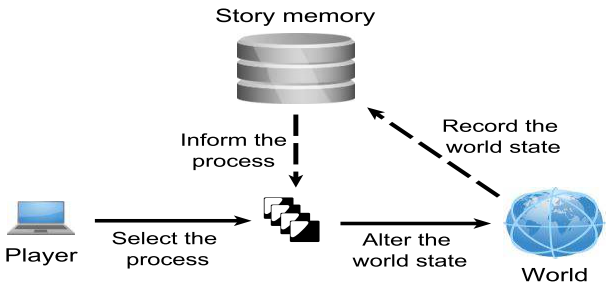

Figure 1: The organization of the main components of the model.

4.2.3 Creation Platform

As well as empowering players with greater control over the course of action, our model also empowers authors to design their own processes based on a rich palette of narrative possibilities. For instance, when developing an "accomplice" process, an author can decide that the accomplice might betray the player under certain conditions. This will be made possible via our scripting language that will also allow an author to access and make use of the story memory.

5. CONCLUSION AND FUTURE WORK

Using a novel approach proposed in this paper we aim to improve and extend emergent narrative in games. To achieve this, we presented a model intended to improve the ability of emergent games to provide greater agency and a large possibility space through the use of out-of-character actions. The model also expands the potential for uncertainty as each process is capable of adapting to a given story state while respecting the coherence of the world. Furthermore, by providing players with greater control over the story as it unfolds we raise the role of player to author of his or her own story.

Finally, our model offers not only a new gaming experience, but also a tool for studying the construction of emergent stories and a potential game master's assistant for multiplayer games.

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