

Towards plot generation in a multi-user context

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Abstract This paper is a position paper addressing issues about multi-user story generation for interactive narrative. From an observation about the way industry deals with interactive narrative in a multi-user context, and a review about the actual solutions for interactive narrative, we propose a story generation procedure and a software architecture able to deliver personalized narrative experiences to numerous users interacting in a shared environment.

Keywords. Interactive Narrative, Plot Generation, Multi-user, Videogames.

1 Introduction

Interactive narrative is an increasingly field of research in the scientific community. Interactive narrative applications are numerous, whether as an evolution of traditional media (like interactive TV drama), in videogame industry, or for e-learning. The opening of narrative to interactivity makes possible to provide a more personal user experience, strengthening immersion. The field counts numerous works, as the narrative control of MIMESIS [15], the elaborated staging of Façade [11], the Interactive Drama Architecture from the University of Michigan [9], the works from the Intelligent Virtual Environments on Hierarchical Task Networks [4] and the integration of user emotional feedback [5], then the theory of emergent narrative [2] or project ID Tension [14].

However, if the question of interactive narrative for a single user is abundantly handled in literature, the multi-user aspect didn't reach maturity yet. Now, the evolution of various media shows that the practices are more and more turned to multi-user contexts: e-learning platforms, Massively Multiplayer Online Games, interactive TV series, transmedia. The implementation of the current interactive narrative solutions to these multi-user contexts can generate specific difficulties.

In this paper, we will address issues concerning the application of interactive narrative in a multi-user context. We will review the various existing manners to approach this question and the limits they encounter. We will then formulate a set of proposals (objectives and method) which are the starting point of current works.

2 Interactive narrative for n users

The issue of multi-user interactive narrative emerged with the appearance of the MMOG. Setting thousands of players in persistent virtual universes indeed raised new issues about narrative management. However the perspective of multi-user interactive narrative can be built only from effective solutions in the single user context. We have noted from 2004 works which aim at using methods of theatrical improvisation to facilitate the appearance of an emergent narrative within MMOG [8]. More recently, some works can be found on this topic, in particular the conception of collaborative narrative for Role-Playing Games [10], the study of the role of Game Masters for multiplayer RPG [7], or still the extension of drama management methods in a multi-user context [13].

The main difference between single user narratives and multi-user ones relies in the ability afforded to every user to influence narratives experienced by the others. In a single user narrative, the user is placed in the fiction that at the moment he uses the system, the narrative exists only for him, despite the large amount of narrative instances produced in the same time. In a multi-user context, this fiction of exclusivity is broken. Every user is aware of other users' existence and of their contribution to the shared narrative experience. This awareness takes place as a sharing of experience, a perception of the other user's actions, or even by direct interactions. This influence of the other users cannot be denied, and must thus be integrated into the narrative process.

Interactive fiction's world already disposes of some solutions to manage a set of users acting on the same contents. Indeed interactive cinemas or MMO games did not wait to propose this kind of experience. Their ad hoc solutions rely on simple bases and are easy to implement. However, these narratives aren't specific to each user and offer the users a "collective narrative" which can oppose the suspension of disbelief.

Interactive movies are a typical example of the notion of collective narrative: every user is regularly required to vote or to act in favor of the wished development. The resulting narrative is thus a succession of "most elected" scenes. This kind of interactive narrative is easy to set up but it can turn out little satisfactory for the user. It is very likely that no user can experience the narrative which he would wish himself. It is even possible that a user sees all his choices rejected by the others and is thus forced to undergo a narrative which doesn't suit him at all.

MMORPG mainly opted for a radically opposite solution. They mostly put in parallel separate narratives by denying at most the existence of the other players, following the model established by World of Warcraft. In this approach, the users evolve in a shared narrative environment but the repercussions of each player's actions are denied in order to allow all the others to enjoy a similar experience. Enemies respawn after their death, resources are unlimited and thousands of players can achieve the same quest one after the other without the universe being altered. This method therefore allows to by-pass any narrative conflict and to insure a comparable narrative experience to all the players, but this solution is effective only as long as players accept to ignore this "narrative masquerade".

However, beyond these two solutions lies a field for other narrative possibilities. For example some persistent worlds (as Second Life, Sim City or the old MMORPG Ultima Online) implements in an empirical way emergent narrative concepts, and so avoids the aforementioned problems. In these environments, all the players can interact with the shared fictional universe and between each other, but all act in an autonomous way. Every user is thus offered a personalized experience which integrates its own interaction with the narrative environment as well as he perceives other user's experiences. However, this kind of narrative isn't well suited to make sure of specific properties like the structure of every individual narrative or its adequacy with the player's expectations. A user can thus be confronted with a narrative lacking of interest for him, or even see his experience wasted by one or several players acting of destroying his narrative proposals.

Therefore, despite their qualities, no actual multi-user interactive narrative proposition manage to combine the objectives of offering narratives both personalized, structured, and taking place in a coherent shared environment.

3 Position and method

We thus propose to set up a system allowing generating for every user a structured and individualized narrative in a shared environment, while insuring the environment's coherence. Aforementioned works from Entertainment Intelligence Lab already addressed the issue of plot monitoring for multiple users [13]. Our work however is oriented towards dynamic plot generation [6]. We do not aim at the creation of a "global narrative" among which would be only partially perceived by each user, but at ensuring that each of the stories presented to every user respect a set of structural properties. Our objective can thus be described by the following properties:

- every user should experience a personalized and structured interactive narrative,
- every narratives take a place in a shared virtual environment,
- every user's narrative affects the shared environment and can thus influence other user's narratives,
- the shared environment's coherence has to be respected.

By personalized we mean that the narrative should result from the user's actions and choices. By structured we mean that the every user's narrative should satisfy structure properties. It can involve archetypal structures, being canonical structures as described by Aristotle[1], Campbell's Hero's Journey [3] or Propp's folktales [12], or even *ad hoc* structures defined by system's designer.

As every user's narratives are taking place in the same virtual environment, it implies that the narrative resources (characters, objects, places, events) are shared. Therefore, access to specific resources can be limited (an object can be used by another user, a character can already be in conversation, etc.) and some user's acts or choices can make a resource unusable for the others (destruction of an item, deep

modification of a place, death of a non player character, etc.). These limitations are thus a source of possible conflict between the ideal narratives of every user and our system must bring a solution to these resulting conflicts.

Our goal is to find a method allowing these potential conflicts to be arbitrated in order to guarantee that no personal narrative is completely blocked by other users' ones, and that repercussions of a peculiar user's narrative have no great negative impact on the other users' ones. To achieve it, we propose a narrative generation distributed over 3 levels:

- client level: specific to each user (videogame, classic interactive fiction application, etc.). It presents the narrative to the user according to the instructions of the story planner level, takes user's inputs and sends the collected information to the story planner.
- story generator level: it receives user's input sent by the client, draws up narrative propositions specific to each user, submits them to the universe manager for validation and delivers the final instructions to the client for execution.
- universe manager level: it receives the narrative propositions from the various story generators and makes arbitration when it detects potential conflicts.

To achieve its goal, the universe manager level will employ a model describing all the available narrative resources (characters, objects, places, actions...) and logic. This model enables him to follow up the modifications brought to the narrative environment by every user's narratives and to calculate for every proposition how it can affect the other narratives.

As an example, the narrative generated for a player in a MMOG can involve a very specific item. On the story generator level, information will be raised up about what happens to this object. If during the narrative the universe manager detects that this item is possessed by another player, it can give specifications about managing events in order to facilitate the exchange of the item from one player to the other, organize the loss of the item from the possessing player and prevent the item from being destroyed, eventually affecting the narrative generated for the second player.

This organization should allow separating the activities of narrative generation and of management of the narrative universe. This division allows distributing the calculations between user's clients and a central server. Each various story generators can work locally on every user's computer, and the universe manager may take place on a cloud server.

4 Conclusion

This organisation should allow finding a balance between the dynamic construction of personalized narrative and global coherence of the shared environment. However, its implementation will raise a set of technical issues. First of all, the synchronisation between the universe manager and the numerous story generators will require to

define exactly which parts of the narrative are calculated and how. The large amount of required operations will clearly raises issues about processing optimisation.

To be completely operational, the universe manager will have to be able to anticipate the users' actions and decisions, in order to avoid discovering too late an action having a too strong impact on the shared environment. Behaviour forecasting methods [9] could however be a good solution to this specific problem.

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