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The *Simula Family*

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ABSTRACT
This paper presents a demonstration of a pedagogical highly interactive drama, which provides the user with many choices on the course of the narrative, by controlling a character in an immersive 3D story.

Categories and Subject Descriptors
H.5.4 [Information Interfaces and Presentation]: Hypertext/Hypermedia – Navigation, User issues. I.2 [Artificial Intelligence]: games. J.5 [Arts and Humanities]: Linguistics, Literature, Performing arts.

General Terms
Design, Human Factors.

Keywords
Interactive Drama, Interactive Narrative, Pedagogical Interactive Drama, Educational Games, IDtension, Wiimote.

1. AN INTERACTIVE PEDAGOGICAL DRAMA

1.1 Interactive Drama
Interactive Drama [1] is concerned with the perspective of playing *with* a story, as opposed to playing *within* a story. Playing within a story means that the playing occurs in fights, puzzles, mazes, races, etc. within the context of a given story. Playing with a story means that the player's moves frequently change the story itself, and that the pleasure comes from this influence, also called agency [2]. In released games, playing with a story is achieved via branching or conditional branching between authored and scripted events. This branching approach cannot provide a lot of possibilities to the player, since it requires a number of cases to be written that grows exponentially with the number of choices. In research-based, story generation algorithms provide the opportunity to generate narrative variations on the fly, according to the player's choice. Envisioned in the nineties [2,3], these interactive drama systems are now coming to reality in research labs but the transition from a "working algorithm" to a "playable and expressive interactive experience" appears difficult. This demonstration constitutes an example of a working prototype of Interactive Drama, with a high level of interaction in a 3D world.

1.2 The IDtension Narrative Engine
To bring the idea of Interactive Drama to life, we are using the IDtension system [4], initiated in 1999. IDtension is based on the following principles:

- Narrative actions are coded in an abstract predicative form, which is then transformed to text and gesture to produce the action played on screen. This enables to reason logically about actions and generate narrative dynamically.
- This coding uses second order embedding, in order to enhance the generativity of the system. For example, the action "Inform(*John*,*Mary*,HaveFinished(*Frank, offering* (*Anna*,*ring*)))" can be played as a dialog between John and Mary in which John says "You know, Frank finally offered the ring to Anna". By varying in the above predicate elements in italics, one obtains a large number of possible actions with limited writing.
- Several rules and mechanics manage the flow of actions, some being based on the logic of the fictional worlds (world's coherence, character's psychology, etc.), other being based on narrative principles, in particular on the estimation of the impact of the action on the user, according to several dimensions.
- The system assumes independence between a story layer and the representation and interaction layer.
- The system is meant to be authored by a person playing the role of an artist, distinct from the IDtension's creators. Several stories have been written so far.

1.3 The context, the story
The demo concerns a pedagogical application in the domain of Psychology. It targets teenagers who have one parent with a Traumatic Brain Injury (TBI). The pedagogical Interactive Drama aims at helping them coping with family situation at home, where the injured parent demonstrates hard to manage behaviors that he or she did not have before the accident.

Within the story, called "The Simula Family", the player can play the role of Frank, a teenager whose father, Paul, suffers from a TBI. Paul has memory problems, can be aggressive and demonstrates inappropriate social behavior. At the beginning, Julia, a schoolmate of Frank visits him to get back her book that she gave to Frank a while ago. Paul would repeatedly make inappropriate remarks, disturbing both Frank and Julia. Olivia, Paul's mother helps Frank finding the proper way of action, while Sophie, Frank's young sister has some different views on the current situation.

By interacting with the narrative, it is expected that the teenager will develop skills that are relevant to his real-life problems. The choice of IDtension potentially provides more choice than scripted health pedagogical games and should be valuable in terms of both richness of situation and player's motivation.

2. THE USER INTERFACE

2.1 3D Rendering

The *Simula Family* story has been initially developed in a text version [5]. This text version is still in use in our research lab as an authoring and testing device but the demo for end-users happens within a 3D environment. The narrative actions generated by IDtension are displayed in a 3D environment, based on the *Unity3D* game engine. A third person view is used for the camera.

Figure 1. The 3D environment.

The scene takes place in a large room containing the entrance, the living room and the kitchen (see Fig. 1). The 3D models and textures of the room have been retrieved from the Internet, for free or limited price. The five characters have been modeled with the *Quidam* software, from predefined models. Animations were selected from motion capture animations catalogs. Behaviors, i.e. the decompositions of narrative actions into elementary animations, have been developed specifically within *Unity3D*.

2.2 User Input

Figure 2. The choice of actions and the interaction device.

The user controls the displacements of the player character with directional arrows (the direction is relative to the camera view). When he or she gets close to a non player character (NPC), it is possible to interact with this NPC, by pressing the enter key. The available actions with this character are displayed in a list, in a transparent layer over the scene. The size of the list is often rather long (which is what we aim for), so it is possible to further filter this list by selecting the subject of the conversation. For example, the user interacts with Paul and then clicks on the icon for Sophie to be proposed the list of actions *with* Paul *about* Sophie. The user then clicks on the action to be played, which generates a series of gestures and dialogs for the player character and the NPC (see Fig. 2).

2.3 The immersive interaction device

While the *Simula Family* interactive drama can be experienced offline or online on a regular computer, this particular demo explores a more immersive setting that includes a large screen projection so that the virtual character gets a human size. The control of the character is performed with a *Wiimote*, the controller of the *Wii* game console. The arrow buttons are used to control the displacements while the pointing device in the *Wii* (via the internal infrared camera) is used instead of the mouse. The main *A* button on the *Wii* replaces the enter key.

3. DISCUSSION

The demo presented in this paper constitutes an important milestone within our global project for helping teenagers with a TBI parent. It will enable to evaluate:

- The quality of the experience on a sample of the targeted population;
- The added value of the immersive version over the desktop version;

The next step consists in enriching the story with several other home situations that will overlap with each other to create more complex family situations. Endowed with these stories, the system will then be clinically evaluated, to assess its effect on the teenager.

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