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Process of development:	This project was developed between December and June 2008 as a 4 th year project to graduate a Bsc(hons) in Computer Science
Resources used:	FearNot! http://www.sourceforge.net/projects/fearnot/
Resources required:	This project was developed and tested on a PC with Windows XP SP2, 1gb ram. But it should run on every machine that can run Microsoft Visual Studio 2003 and FearNot!.

Title Creating Stories

1. The application and context of the work

The main objective of this project is to define some characters from a well-known classic novel and see if a scene from the novel can be played out. This had been achieved by the implementation of characters using the FearNot! framework. This software provides a 3d environment in which intelligent agents can interact. It has been produced to explore one of the approach of what we call interactive narrative. Unfortunately I had to focus on the emergent narrative part to verify if FearNot! could be used to create stories such as the ones we read in books. Interaction with the user could be easily added for another project.

2. Novelty

The FearNot! Framework is quite new. As far as I am concerned, no one ever tried to use it to produce a story inspired by an actual novel. Therefore, the architecture existed, and the main point was to see if the story could be enjoyable for the viewers/users using this framework. Therefore this work could be linked with every project dealing about interactive or emergent narrative.

3. The architecture

The agents used in this project, and more generally, FearNot! agents are appraisal-driven. It means that each event perceived through receptors are evaluated within their minds before the proper effector is selected. Moreover, the agents ' action are defined via a set of goals that they will try to achieve. Their emotional state is defined using the OCC model (composed of 21 emotions which are differently perceived by the different agents). In addition, dialogues are managed using the SPIN engine. Following is a more detailed description of the agent architecture : FatiMA.

a) FatiMA

Hence, as said before, emotions are steamed from the OCC model. Emotions are defined as « valenced (good or bad) reactions to events ». In this context, emotions define a « hierarchical organization of emotion types ». Emotion types being a panel of related emotions differing in terms of their intensity. For instance, the emotion « fear » which can arise after the failure of a desired goal can either result to « concern », « fright », or « petrified » depending of the intensity of the emotion. Here are the different attributes of an emotion :

- Type : the type of the emotion being experienced
- Valence : Denotes the basic types of emotional response. Positive or negative value of reaction
- Target : The name of the agent/object targeted by the emotion
- Intensity : The intensity of the emotion
- Time-stamp : The moment in time when the emotion was created or updated

Notice that emotions are attenuated through time because of a decay rate specific to each character for each particular emotion. In addition they all have a threshold that make them more or less likely to experience a given emotion. Hence, some characters can stay petrified for a longer time than others and some can « feel » fear after a particular event while other won't.

Moreover, each agent also has its own personality defined by a set of goals, a set of emotional reaction rules; action tendencies. We can distinguish two different types of goal :

- Active-pursuit goals : the characters actively try to achieve something like going somewhere
- Interest goals : a goal that the character has but does not pursue like not being hurt

Goals are defined as follow :

Active-pursuit goals	Interest goals
Id : goal identifier	Id : goal identifier
PreConditions : A list of conditions verified to	ProtectedConditions : A list of conditions that must

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activate the goal	be preserved
SuccesConditions : A list of conditions used to determine if the goal is successful	
FailureConditions : A list of conditions that determine the goal failure	
ImportanceOfSuccess : Specifies the goal's importance of Success	ImportanceOfSuccess : Specifies the goal's importance of Success
ImportanceOfFailure : Specifies the importance of Failure	ImportanceOfFailure : Specifies the importance of Failure

The emotional reaction rules define how events are appraised (the evaluation process of the relationship between an event and the character's emotion).

Furthermore, when an event is perceived by what we call « sensors », it goes through two processes : « appraisal » and « coping ». Both of these stages involve two layers : the reactive layer and the deliberative layer. The reactive layer, generates all the possible actions to respond to the incoming event and selects the most appropriate one while the deliberative layer acts as a planner to achieve a goal. Then, according to the emotional state and the related appraisal the response selected during the coping process can either be :

- An impulsive action : The intensity of the emotion triggered by the event makes the character cry for instance (defined by the action tendencies). In other words, such actions are not the result of any goals.
- A deliberated action : The event triggered the failure or the success of a plan so the corresponding action is executed. For instance, if a character wants to pick up a book far away. The plan consists of moving near the book and picking it up. But if some other agent throw the book next to him, there is no need to move, so the agent's intention is now to pick up the book. Hence the deliberative layer triggers the proper emotion so that the action will be to pick up the book.
 - These reactions have these characteristics :
- A subject
- An action
- A target
- Some parameters that specify additional informations about the action
- The desirability of this event (how good or bad it is for the character)
- The desirability for others (how good or bad this event will be for the targeted character if there is on)
- The praiseworthiness of the action performed (a subjective evaluation according to the character). For instance, in the context of bullying, the bully might consider pushing other people praiseworthy while the victim considers it to blame.

b) FearNot! Episode structure

Basically, the FearNot! software is composed of a set of episodes featuring the intelligent agents. These episodes have a set of preconditions, so that each of them can or can not be triggered depending of what happened during the previous episodes. They also are defined by a lot of parameters defining the place where the scene takes place, the agents that it will involve, the finish conditions that will determine when the episode has to terminate etc...

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Notice that all the files defining the agents and the episodes are XML files. Generating these files is a very painful process since a lot of data are required. Therefore one step of this project was the implementation of a JAVA XML editor to shorten down this process.

4. Performance

a) Evaluation

The evaluation of the final system was done via a form filled up by several people, mostly computer science students or students contacted through the student peer to peer network. Unfortunately, most of these people were in their twenties, and had only poor memories of their childhood readings. Therefore the evaluation of the accordance between the system and the actual book was not as efficient as expected.

Here is the form the subjects had to fill up :

Age	Years old						
Have you ever heard about the famous five ?		YES	NO	If you haven't, fill up the section 2			
Have you ever read one of the famous five book ?		YES	NO	If you haven't, fill up the section 2			
The interrogated person shoul			d know watch	a run of the F	earNot! Software		
Section 1							
Did you enjoy watching this story ?		A LOT	YES	NOT MUCH	NO	NOT AT ALL	
Was the	content of the story believe	able ?	A LOT	YES	NOT MUCH	NO	NOT AT ALL
Did the following characters behave as you expected ?							
		Anne	A LOT	YES	NOT MUCH	NO	NOT AT ALL
		George	A LOT	YES	NOT MUCH	NO	NOT AT ALL
		Dick	A LOT	YES	NOT MUCH	NO	NOT AT ALL
		Julian	A LOT	YES	NOT MUCH	NO	NOT AT ALL
Did this story remind you an actual book of the series ?							
If yes, please sta With the book	te which one and notice an	y difference					
Did you feel some empathy with the characters ?		A LOT	YES	NOT MUCH	NO	NOT AT ALL	
			Section 2				•
Did yo	ou enjoy watching this stor	y ?	A LOT	YES	NOT MUCH	NO	NOT AT ALL
Was the	content of the story believe	able ?	A LOT	YES	NOT MUCH	NO	NOT AT ALL
Can you in a few	words describe the following	ig	A LOT	YES	NOT MUCH	NO	NOT AT ALL
Characters :		Anne					
		George					
		Dick					
		Julian					
Did you feel some empathy with the characters ?		A LOT	YES	NOT MUCH	NO	NOT AT ALL	

The subjects firstly had to watch a simple run of the system (through a video). Hence they were able to watch several episodes that could be the story as it is in the book or an alternative one. Then they had to fill the form up. If the watched story was different from the book, they then were told to watch a video of the actual story and asked to give any commentary they could have. Twelve people were consulted, for an average age of 24 years old. The youngest being 10 years old and the oldest 60 years old. 75% of these people were above 20 years old. Moreover, 60% of them knew the Famous Five because they had already read one of the book (it represents 7 out of 12 persons). Here are two diagrams showing how the subjects answered to the form.



We can see that most of the subjects enjoyed watching the story. Sometimes the term "believable" required to be clarified. Therefore, by believable, we mean : Are the character coherent and do they believe like young heroes would do in a book ? These results are really satisfactory. However only 2 out of 12 people felt empathy for the characters. Such a surprisingly negative response was most of the time explained by the fact that the agents do not have enough facial expression. Another explanation was the lack of animation, mostly when the agents say that they are actively doing something (like looking for the hidden way).



On this diagram we can observe that 3 out of 4 characters were accurately represented in the system. The subjects who were familiar with the Famous Five felt that the agents George, Anne and Julian behaved like in the book. Nevertheless they found that the similarity was not that obvious with the agent Dick. Actually, the main reproach was that he had a kind of secondary role in the system. In addition they thought that he appeared less adventurous than in the books. In spite of this point, these results are again, rather satisfactory.

	Subject 1	Subject 2	Subject 3	Subject 4	Subject 5
Anna	The whiny child of the group	Easily scared, often complaining	A fretful character	The baby of the group	She doesn't fancy treasure hunting
George	Adventurous and narrow-minded	Fond of treasure hunting, can be silly	A fiery tempered character, she likes adventures	She is a bit of a bully and seems enthusiastic when dealing with adventures	She fancies treasure hunting and can be mean with the others
Dick	Well-balanced, sometimes adventurous, sometimes less	Nothing particular	Seems to be a mix between George and Julian	Very kind with Anna, and adventurous	Jack of all trades
Julian	The wise guy	He likes taking decisions. He appears to be the leader of the group	The leader of the group	He is the one who comes up with good ideas and he manages the others	He always have the last word, he always disagree with George

Concerning the subjects who weren't familiar with the Famous Five, here is how they described the characters :

This results are quite encouraging. As a whole, the descriptions rather match the way the agents were defined. Perhaps the fact that the dialogues mostly come from an actual book helped as speech is one of the most efficient way to reflect one's mind.

Last but not least, the people who had read some books of the Famous Five during their childhood stated that the story was quite similar to the stories they remembered from the books. But unfortunately nobody was able to identify the story.

Finally, all these results are really good, this innovative narrative medium seems to please the users.

b) Achievements

The main achievement of this project is the successful translation of a story from a book to a new and innovative narrative medium. The specified agents can reproduce a rather similar story, but they also can play a totally new story. This had been possible through the implementation of a rather important amount of actions and goals (88 goals and 72 actions) in addition of a pretty useful game master point of view which drew the road map to good unpredictable stories (I had an interview with him during the project). However, the satisfaction of the user is highly dependent of the framework used to produce such a story. On one hand the animation corresponding to the actions have to be implemented within the framework. If it is not the case it requires a lot of overhead implementation costs to add them. On the other hands, the graphics of the framework limit the possibilities to create a story from scratch since the available graphics are really context specific. In addition, this system lacks the user's interactions that were initially planned to really improve the user's experience. Anyway, the subjects who evaluated this system were rather satisfied which is the main concern of any author.