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Using Perspective in Narrative Learning Environments

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Abstract. Several empathic applications have been developed over the last years but can we redirect that empathy to specific characters? This paper focuses on the intention to induce empathy in children and stimulate role taking by presenting a narrative through the perspective of a specific character. The use of perspective is achieved by showing the events that happen in the story but without impartiality.

We will describe a narrative-based application designed to help children cope with bullying situations, the *FearNot!* demonstrator, and an embedded filter that provides the subjective point of view of its characters, by observing the personalities and the relationships between those characters.

1. Introduction

The aim of this paper is to develop a way of influencing the emotional reactions of users of a virtual storytelling environment through the use of "perspective". To study that, we have to contextualise our approach and, therefore, we have applied it within the *FearNot!* application, which is a learning environment used to help children become aware of how to deal with bullying problems in schools.

If we want to increase or influence the empathy felt by the child (user) towards characters in a simulated 3D emergent story, s/he must not feel as an outside observer but, instead, as if taking a role in the narrative. In other words, in order to establish an empathic relation, the child must identify herself with a particular character. For such "role taking" to happen, the perspective that is "absorbed" by the user is quite important. In fact, we all have a need to know different perspectives of a story, whether to understand it as a whole, by gathering different information, or simply because we trust one's version better than someone else's. This is what motivates authors to create *Multiform* or *metalinear stories*, which are narratives that provide the participant with multiple perspectives or different versions of one single plot.

In a story we can identify two important levels, which equally contribute to its success and complement each other: the *narrative level* and the *narration level*, [3]. The *narrative level* corresponds to the events and to what happens in the story. The *narration level* corresponds to the way the events are presented, to the way the story is told (or shown), [10].

Since narration is defined as the way the plot is presented, [10], it depends on who tells the story and on how it is presented. This happens because the person who tells it has perceived the story in a personal way, which implies that when we observe, for example, the reactions of a character through the perspective of a person *A* we will experience the narrative differently than through the perspective of a person *B*.

In conclusion, events in a story can be "seen" differently if they are seen through the eyes of different characters. Based on this, we have built a specific system for presenting a

character-based perspective, which will allow the child to experience a different narration according to the character that is *telling* the story.

The solution, here proposed, to introduce perspective without changing the actions of the characters aims at influencing the notion of intentionality. This choice was based on the fact that our perceptions are associated with our feelings of empathy and, according to some authors, empathy derives from intentions.

Jean Decety, [4], has studied empathy through the observation of the process of imitation and has found that "when observing someone's action, the underlying intention is equally or perhaps more important than the surface behaviour itself". His statement is in accordance with what had been studied and suggested by Meltzoff, [11], and Baldwin, [2]. Both authors claim that when we observe others we "look" at their intentions and use that information in our responses.

So, in this paper we will present a system for perspective creation in a virtual storytelling environment.

This paper is organised as follows: we will begin by explaining the bullying problem, in order to contextualise the *Victec* project, and then describe the *FearNot!* application, developed within the same project. Afterwards, we will present our approach to introduce perspective and describe the *Perspective Filter* and its implementation within *FearNot!*. Finally, we will provide orientation for future work.

2. A Brief Description of Victec and the *FearNot!* Demonstrator

The main goal of the *Victec* (*Virtual Information and Communication Technology with Empathic Characters*) project[1] is the prevention of a specific form of aggressive behaviour, that is, bullying situations. Bullying behaviour can be described as an intentional and repeated aggression (not necessarily physical) where there is an imbalance of power, [12]. This behaviour can be divided into two different forms of aggression:

Direct Bullying – also referred to as *physical bullying*, it includes, for example, actions such as hitting, kicking, threatening or taking belongings, [7];

Relational Bullying – this type of bullying is expressed through social behaviours such as social exclusion, malicious rumour spreading, and the withdrawal of friendships, [16].

Bullying represents a global problem, as it has been identified in several countries. It occurs mostly among children in schools, namely in the playground or in the classroom. The decrease of these aggressive situations is a priority in our society. So far, antibullying initiatives have not been very efficient. The *Victec* project introduced a new approach to the problem, as it is based on the use of a virtual learning environment where self-animating empathic characters simulate bullying situations using emergent narrative. The result was a software program designed to help reduce aggressive behaviour of children between the ages of 8 and 12, [14]: the *FearNot!* demonstrator. *FearNot!*, which stands for *Fun with Empathic Agents to Reach Novel Outcomes in Teaching*, is an interactive application embedded in a virtual environment, that uses synthetic cartoon-like characters.

In *FearNot!* the emergent narrative is accomplished through the use of intelligent synthetic characters, implemented with an emotional model and a social memory.

In the context of *FearNot!*, an empathic relation is precisely induced between a child and the synthetic characters. In order to achieve that, the characters play a bullying situation, placing the child as an observer, [13].

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[1] All the information related to the *Victec* Project can be found at the official website of *Victec*, http://www.victec.org.

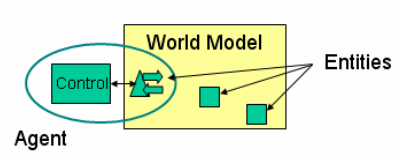


Figure 1. The *FearNot!* Architecture.

The aim of this application is to induce affective responses in children during bullying situations, and thus "change their behaviour and cognitions", [14]. *FearNot!* allows an evaluation of the believability of the characters as well as of whether children will develop empathic relations with those characters.

This program creates an episodic narrative, as it generates a sequence of small episodes. The narratives are generated either in the context of direct or relational bullying situations that take place in a school. At the end of each episode, children will interact with the characters and give advice. These pieces of advice will influence the following episodes.

2.1The Architecture

FearNot! was implemented with an agent-based architecture (see Figure 1). This application was built using autonomous agents that decide, as the narrative unfolds, their behaviour and contribution to the narrative itself. At the implementation level this translates into changes that affect the *world model*.

The agents in *FearNot!* have an emotional behavioural model and act in the world according to it (see [8]). Their actions are a consequence of their perceptions of the world, which are a result of interacting with each other or with the child.

This unscripted narrative environment represents a challenge to the creation of character-based perspective as it is impossible to pre-determine the course of the narrative and the actions of each agent.

So, in order to "shape" events that are created by autonomous agents, we propose to generate parameters to model the emergent narrative as the agents produce their behaviour.

3. Providing Perspectives

The approach here presented, in order to create perspective-oriented narrative, consists of influencing the perception of intentionality in a virtual storytelling environment. To achieve that, we aim at "shaping" the intensity of what is seen so as to influence the visualisation, and thus the perception, of the bullying episodes. This suggestion to provide perspective, should be accomplished as the characters in the story decide to perform an action, but without directly affecting or altering the action performed.

To achieve this goal we propose to adapt the intensity of the actions performed by the characters to the appropriate perspective as well as to emphasise those results through the use of a camera. We have created a filtering module so that when it receives the instructions regarding the actions that will be performed, it will filter that information and generate the appropriate instructions to the *world model*. This filtering is applied to the information that is shared by the *control* and the *world* modules (see Figure 2).

The module that we present to create perspective will analyse some of the personality aspects of the characters, the relationships they had with one another and the actions they performed, thus providing the adequate narration of the events.

We do not intend to show accuracy between the intensity of the action and the personality of the character performing the action. Every action is, therefore, filtered in order

to make prevail the perception of the "owner" of the perspective or even his distortion of the truth.

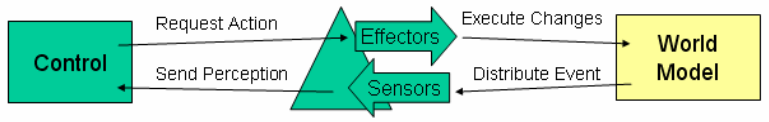


Figure 2. The control module interacts with the world module by, cyclicly, receiving perceptions and returning actions that have effect on the world.

All of the choices that were made during the development of this work were based on the Disney principle of exaggeration, [9]. This "ideology" was followed in order to create more impact on the child, rather than trying to achieve realism or simulate real behaviour.

3.1The Perspective Filter

The *Perspective Filter* is the module that interprets every action and "shapes" the way it is displayed during the narrative experience (see [15]). This filter provides a structure that is independent of the narrative itself and the characters who participate in it, since it extracts all the relevant information about those characters from their *functional roles*. In other words, this module is based on the stereotyping of the role of the characters, through their personality traits.

For example, when we choose to see an episode according to the perspective of a character A, and whenever an action is performed by a character B, different parameters will vary according to the relationship between the two characters and according to one or two personality traits of character B.

So far, the parameters that influence the way the action is displayed are: the type of camera shots and the intensity of the action (consider, for example, that when an aggressor pushes a victim we can observe a slight push, from his perspective, or a violent one, from the perspective of his victim).

The way the *Perspective Filter* works is sketched in Figure 3.

3.1.1 Perspective Types

The relationships we build with others influence the way we interpret events as well as our views on them, so it was mandatory to include this influence in our creation of perspective in storytelling.

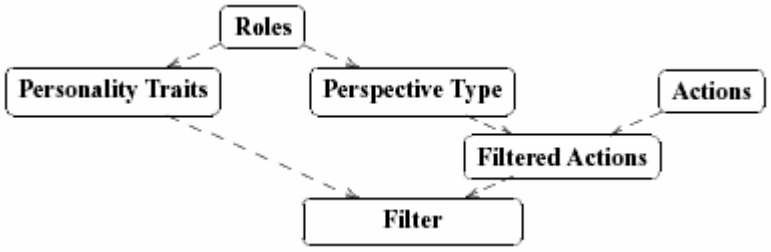


Figure 3. Inputs of the Perspective Filter.

The best way to include the information provided by interpersonal relationships in our module was to create different types of perspective. Therefore, we have considered three main types of perspective: a *self-perspective*, a *friendly perspective* and an *unfriendly perspective*. These different types are based on the relationship between the "owner" of the perspective, or *focalizor*[2], and the character who performs the action. The *self-perspective* will obviously occur whenever the character whose perspective we are following performs an action. The *friendly perspective* is shown whenever the focalizor feels empathy for the character who is conducting the action. Finally, we observe an *unfriendly perspective* if the action to be viewed is executed by a character who does not provoke empathy in the focalizor.

The purpose of these different types of perspective is to enhance the negative actions, and to give less importance to the positive or neutral actions, of "enemies" and to do the opposite regarding the actions conducted by friends (or the focalizor's own actions).

The combination of the three types of perspective, based on who is performing the actions, is what provides the subjectivity of the focalizor in the experience.

3.1.2 Character Roles and Personality Traits

The roles play an important part in the decision concerning how to filter the narrative. Most narratives include a structure which allows stereotyping the characters in predefined roles, such as the hero and the villain. So, using roles is advantageous given that they can be used with every narrative, and not just in the case of bullying scenarios.

The use of roles has enabled the definition of relationships between groups of characters and, therefore, the creation of a structure which is independent of the narrative itself. Since each character is always attached to a role, the personality traits of each character are induced by the personality traits defined for his role.

The personality traits defined were the following: Aggression, Hot-temper, Self-esteem, Shyness and Anxiety.

These traits were thought to be appropriate to influence how an action is shown, especially in a context where they represent the most noticeable features in the roles. For instance, regarding the bullying scenario, these personality parameters were the ones that stood out the most when defining the profile of personalities involved in bullying.

Aggression – this trait is very useful to show intentionality when modelling the bullying scenario;

Hot-temper – this characteristic is usually associated with aggression and is used in certain actions that can be seen as impulsive;

Self-esteem – certain actions such as "crying" are commonly associated with self-esteem. This statement does not necessarily mean that those actions are triggered by the level of self-esteem, simply that we often look at them as the behaviour of a person with low or high self-esteem;

Shyness – we regard certain actions as "bold" attitudes for a shy person, therefore shyness represents a strong parameter to influence the emphasis in the actions;

Anxiety – this trait is associated with actions that are viewed as the behaviour of "nervous people".

For each action, one or two personality traits are taken into account. In order to "exaggerate" the results, and thus create more impact when generating the perspectives,

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[2] The term *focalization* was introduced by Mieke Bal, [1], to represent "the relation between the vision and that which is 'seen', perceived". Edward Branigan, [3], defines the *narrator* as the provider of statements and the *focalizor* as the provider of his own experience.

each trait can only assume one of these three values: **high**, **normal** or **low**. As a result of this constraint, we expect to achieve more contrasts between different perspectives.

We are aware of the fact that these five personality parameters are not theoretically sustained as a complete personality model, in opposition to the Five-Factor Model proposed by Costa & McCrae [6], for example. Nevertheless, if we had used the Five-Factor Model of *Extraversion*, *Agreeableness*, *Conscientiousness*, *Neuroticism* and *Openness*, as our personality model, we would have had serious difficulties in determining which traits would influence each of the usual actions available to characters in a narrative.

Therefore, and since we do not want to generate behaviour with our perspective module, instead of considering a (complete) personality model, we just considered some personality traits. This choice was much simpler than the Five-Factor Model, but powerful enough to differentiate the personality of each character present in normal narrative stories.

3.1.3 Perspective Parameters

To provide the perspective of a character during the emergence of a narrative, this work has combined the values of two parameters. The two parameters considered were the following:

- Camera Information – indicating the shot, angle and target framed during the action;
- Action Intensity – the action is shown with more or less intensity, revealing intentionality or the lack of it.

The camera is what allows us to "witness" the story. Some shots can put us in a character's shoes while others can move us away from the story, transforming it into something that produces no empathy and even dissolving any sort of interest we might have in the narrative being told.

Thus, the shots might provide us with either intimacy or indifference towards the events. For example, if we observe from a distance, we will feel more indifferent than if we watch a character in a close-up, as we are given the impression of being inside the story, feeling immersed. Hence the importance of the camera shot to this project.

The power of the shot is taken into account by several researchers, who understand it cinematographical importance to influence the perception of the viewer. For example, the *Mimesis* architecture, [17], includes a *discourse planner* which determines the appropriate camera shots according to the actions performed by the characters.

Furthermore, we also want to induce the notion of perspective through the level of intensity used in the animations. The intensity of an action directly influences the perception we have of the action itself.

Our aim is to manipulate the animations in order to simulate a degree of intentionality, thus originating different perceptions when using different focalizors. For example, when considering the bullying scenario, from the bully's perspective, he will not perform negative actions intentionally as he will not want to emphasise his "bad behaviour", so these actions will be viewed with little intensity. But from the victim's perspective, the bully's aggressive actions were completely intentional, therefore, they will be shown with great intensity.

3.2 Implementing Perspective in FearNot!

Within the scope of the *Victec* project, we have implemented the *Perspective Filter* described above in the *FearNot!* demonstrator. We will now see the character roles and actions that appear in this application and how personality traits were associated with them.

Table 1. Personality Traits of the Characters of *Victec*.

	Bully	Victim	Bully\Victim	Assistant	Defender	Outsider
Aggression	High	Low	High	High	Low	Normal
Hot-temper	Normal	Low	High	Normal	Low	Normal
Self-esteem	High	Low	Low	Normal	Normal	Normal
Shyness	Low	High	Low	Low	Normal	Normal
Anxiety	Low	High	High	Low	Normal	Normal

3.2.1 Roles in Victec

As we have seen before, the *Victec* project is embedded in the bullying scenario, which usually involves six typical roles. Here is the description of each role, as provided in the official site of *Victec*:

- Bully: bully others only and are not victimised;
- Bully/Victim: bully others and are victimised at times;
- Victim: victimised but do not bully others;
- Defender: defend and help the victim when they are bullied;
- Outsider: do not defend or help the victim or assist with the bully. Neutral but may be an onlooker to the incident;
- Assistant: helps the bully in bullying incidents.

The personality traits considered for the *Victec* characters are presented in Table 1. The values of the personality traits are sustained by the information given by the stereotyping of the roles included in a bullying scenario.

3.2.1 Actions in Victec

We have considered one or two personality traits, as mentioned above, in order to change the way an action is displayed. These choices were made according to the traits of personality that we usually associate with certain actions or the way we perform them. For instance, we associate Aggression and Anxiety with the action `Drop`.

Here is the list of all actions included in this work, so far. They are grouped by their valence and associated with the personality traits that influenced their visualisation.

Negative (or non-prestigious) Actions:

- `Cry` – Anxiety, Self-esteem;
- `Drop` – Aggression, Anxiety;
- `Kick` – Aggression, Hot-temper;
- `Mock` – Aggression, Shyness;
- `Push` – Aggression, Hot-temper;
- `SpeechAct` (`Confrontation`) – Aggression.

Neutral Actions:

- `MoveTo` – Self-esteem, Shyness;
- `Pick` – Aggression;
- `SpeechAct` (`Help`, `Socialising`) – Self-esteem, Shyness.

In conclusion, we implemented the Perspective Filter in *FearNot!* by using the specific roles (and respective personality traits) and actions mentioned above.

As for the camera shots, we are planning to create a set of fixed-shot cameras for each character. This means that when the perspective filter orders a change of shot, the active

camera will be switched, instead of being moved. The concept of placing a set of cameras to film the same event has been described in [5], although in this case the different cameras also provided the same shot but using different angles.

4. Conclusions and Future Work

The *Victec* project aims at reducing aggressive behaviour in children within schools by inducing empathy. In this paper we have proposed to induce role taking by filtering a narrative through the perspective of a character. By inducing "role taking", we do not aim at promoting bullying behaviour when providing the perspective of the bully, but to allow the comparison between his perspective and the one from the victim and to provide a means of reflection.

This filter is being implemented within the *FearNot!* demonstrator but, for the time being, the camera module has not been implemented yet and, thus, it has not been possible to test the results of our methodology.

If proved to be a successful proposal to increase empathy, the perspective filter could also include new parameters, such as the sound. For example, listening to heartbeats will induce panic or anxiety and using strong and aggressive tunes will emphasise angry actions (whereas a cheerful background tune will "lighten" the perspective).

5. Acknowledgements

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References

[1] M. Bal. *Narratology: Introduction to the Theory of Narrative*. University of Toronto Press Inc., 1985.

[2] D. A. Baldwin and J. A. Baird. Discerning intentions in dynamic human action. *TRENDS in Cognitive Sciences*, 5(4):171–178, April 2001.

[3] E. Branigan. *Narrative Comprehension and Film*. Routledge, 1992.

[4] T. Chaminade, A. N. Meltzoff, and J. Decety. Does the end justify the means? a pet exploration of the mechanisms involved in human imitation. *NeuroImage*, 15(2):318–328, February 2002.

[5] D. B. Christianson, S. E. Anderson, L. wei He, D. Salesin, D. S. Weld, and M. F. Cohen. Declarative camera control for automatic cinematography. In *AAAI/IAAI, Vol. 1*, pages 148– 155, 1996.

[6] P. T. Costa and R. R. McCrae. Four ways five factors are basic. *Personality and Individual Differences*, 13, 1992.

[7] K. Dautenhahn and S. Woods. Possible connections between bullying behaviour, empathy and imitation. In K. Dautenhahn and C. L. Nehaniv, editors, *Proceedings of the Second International Symposium on Imitation in Animals & Artifacts*. The Society for the Study of Artificial Intelligence and the Simulation of Behaviour, 2003.

[8] J. Dias. Fearnot!: Creating emotional autonomous synthetic characters for empathic interactions. Master's thesis, Instituto Superior Técnico, March 2005.

[9] O. Johnston and F. Thomas. *The Illusion of Life: Disney Animation*. Hyperion, October 1995.

[10] D. L. Kung. Milestone: Computer orchestrated asynchronous sound and picture editing. Master's thesis, Massachusetts Institute of Technology, June 1995.

[11] A. N. Meltzoff. Understanding the intentions of others: Re-enactment of intended acts by 18-month-old children. *Developmental Psychology*, 31(5), September 1995.

[12] D. Olweus. Bully/victim problems among schoolchildren: Basic facts and effects of a school based intervention program. In D. J. Pepler and K. H. Rubin, editors, *The Development and Treatment of Childhood Aggression*. Lawrence Erlbaum Associates, 1991.

[13] A. Paiva, J. Dias, D. Sobral, R. Aylett, P. Sobreperez, S. Woods, C. Zoll, and L. Hall. Caring for agents and agents that care: Building empathic relations with synthetic agents. In *Proceedings of the Third International Joint Conference on Autonomous Agents & Multi-Agent Systems (AAMAS 2004)*. ACM Press, July 2004.

[14] H. Schaub, C. Zoll, and R. Aylett. Modelling empathy: The EU-project VICTEC (Virtual Information and Communication Technology with Empathic Characters). Presented at Fifth International Conference on Cognitive Modeling, Bamberg, Germany, 2003.
[15] A. Vaz. Your perspective is not mine! Introducing perspective in interactive narrative. Master's thesis, Instituto Superior Técnico. Under submission.
[16] D. Wolke, S. Woods, L. Bloomfield, and L. Karstadt. The association between direct and relational bullying and behaviour problems among primary school children. *Journal of Child Psychology and Psychiatry*, 41(8), November 2000.
[17] R. M. Young, M. O. Riedl, M. Branly, A. Jhala, R. J. Martin, and C. J. Saretto. An architecture for integrating plan based behavior generation with interactive game environments. *Journal of Game Development*, 1, 2004.