FantasyA - The Duel of Emotions

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Abstract. *FantasyA* is a computer game where two characters face each other in a duel and emotions are used as the driving elements in the action decision of the characters. In playing the game, the user influences the emotional state of his or her semi-autonomous avatar using a tangible interface for affective input, the *SenToy*. In this paper we show how we approached the problem of modelling the emotional states of the synthetic characters, and how to combine them with the perception of the emotions of the opponents in the game. This is done by simulating the opponents action tendencies in order to predict their possible actions. For the user to play, he or she must understand the emotional state of his opponent which is achieved through animations (featuring affective body expressions) of the character. *FantasyA* was evaluated with 30 subjects from different ages and the preliminary results showed that the users liked the game and were able to influence the emotional states of their characters, in particular the young users.

1 Introduction

Believability is one important issue when constructing synthetic characters. Characters that are believable provide richer interactions to the users engaging them more deeply in the interaction experience. Emotions have a crucial role in the creation of such believable characters, as Bates [2] stated, emotions create the "illusion of life" that drives the users to the suspension of disbelief.

A large part of the research on emotions in synthetic characters has been primarily concerned with the problem of expressing emotions [6] [10]. This is a fundamental and indeed quite difficult problem, and our technology so far does not allow us to obtain a truly believable synthetic character.

However, it is not only the expression of emotions that is essential to regulate communication with synthetic characters. Several other important aspects such as gesture, speech, etc, are needed. In particular, the capability to understand the other's emotional state is part of that regulation process and must not be forgotten.

In this paper we show how we approached the problem of modelling the emotional states of other synthetic characters, combining it with the adequate emotional processes, action tendencies and expression in the agents. This was

done using the context of a computer game, *FantasyA*, where emotions are the essential mechanism for playing the game.

The remainder of this paper is organized as follows. First we describe *FantasyA* and how the interaction between the user and the system is achieved. Secondly we describe the emotional theory behind the scenes and how the characters take into account the emotions of others in making decisions. Finally we briefly describe a study conducted to evaluate the system and its results.

2 FantasyA

FantasyA is a computer game where users play the role of an apprentice wizard who is challenged to find the leader of her/his clan. In the first challenge the wizard must duel other apprentices in the magic arena until s/he masters the basic magic skills and is ready to proceed to the exploration in the land of *FantasyA*.

To control the characters in the game, players use the *SenToy*, which is a tangible interface in the form of a doll that allows the user to transmit emotions to a synthetic character (see [9] for more details). It allows the user to influence six emotions (anger, fear, surprise, gloat, sadness and happiness) by expressing gestures associated. E.g. moving the doll energetically up and down will induce happiness, while placing the doll arms in front of its head will induce fear.

The duel is played in a virtual environment, the arena, by two software agents one influenced by the user and another influenced by an AI player controlled by the system. The agents are semi-autonomous as they make their own decisions, but those decisions depend on the emotional state that was induced by the player.

The actions performed by the characters in the game are spells. Characters can cast offensive spells to inflict damage on the opponent, cast defensive spells to heal and protect themselves, or cast spells that gives them more power during combat.

The duel is run in a turn taking sequence. Each turn the acting player induces an emotion to his/her character, the character will act according to its and the opponent's emotions, and then both characters react emotionally to the results of the action performed. The acting player changes and a new turn is played. The game ends when the maximum number of allowed turns was reached or when a character has taken too much damage.

3 Conflict of Emotions

The emotional state of each agent is essential for the whole organic of the game. Basically it is the emotional state that constrains, or more accurately, influences, the actions to be taken by the characters. However, given that this is a game, and game-play and must be considered, the action tendencies should produce concrete rules that could be easily learned by the player. This means that if

one player once learns that making her/his character angry will induce it to attack, when s/he in future influences the same emotion the character should also attack, following the player's expectations. On the other hand we didn't want to map the emotions directly into actions (e.g. if a character is angry it always attacks) because this would weaken the emotion role as the player may misinterpret the emotional influence and fail to distinguish it from the action itself. So we decided to try an approach where the players had to consider not only their characters' emotions but also the their opponents' emotions.

3.1 Action Decision

FantasyA characters use their emotions and their feeling about the opponent's emotions to decide what action to take. The decision is made based on the action tendencies that those emotions induce on the character. These action tendencies can be of two different types: induced by the character's own emotions or induced by the opponent's emotions. The design of the first type of action tendencies was supported by the emotion theories formulated by Lazarus[7], Darwin[3] and Ekman[4].

According to Lazarus, fear's action tendency is avoidance or escape, therefore a frightened character will favor defensive actions. Anger has an innate tendency for attack, angry characters will favor offensive actions. Sadness by its turn does not have a *"clear action tendency - except inaction, or withdrawal into oneself"*, a sad character prefers actions that do not involve the opponent, e.g. non offensive actions. Happiness induces a sense of security in the world, happy characters are unconcerned about defense and favor offensive actions. Surprise appears on Darwin's definition on the same axis as fear, therefore surprised characters favor defensive spells. Paul Ekman describes gloat as an expression of anger when the relation towards the blameworthy object is of clear superiority, characters when gloating favor offensive actions.

To address the action tendencies induced by the others' emotions we looked at theories of empathy [11], emotional contagion[5] and social referencing[1]. Empathy and emotional contagion suggest mechanisms for transmitting emotions to others, while social referencing has been defined as the *process of using another persons interpretive message, or emotional information, about an uncertain situation to form ones own understanding of that situation*[1].

Following the social referencing theory we can evaluate the situation and decide what to do based on the current emotion of the opponent. This emotion induces action tendencies on the opponent that can be assumed to be, and in fact are, the same as for the acting character. By imagining the action that the opponent is willing to perform the character will have tendency to counter that action. Therefore if the opponent's emotional state is such that it induces an attack, the character should defend otherwise it should attack (e.g. if the opponent is happy this should mean that it feels comfortable about the current state of the duel and will attack, thus we should defend to counter its confidence in the attack). We agreed that the reaction to the situation depends highly on the personality of the character. In the example above we described the behaviour

of a cautious character, but if it had a more aggressive personality it might respond to the attack tendencies of the opponent with attacks and not defenses. Following this idea, and also to increase the richness of game-play, we defined different personalities for each clan giving them action tendencies based on the opponent's emotion according to the personality.

Combining both tendencies we get an overall action tendency for the character that is used in the action decision process. If both action tendencies are offensive then the character chooses strong offensive actions. On the other hand if both action tendencies are defensive the character chooses strong defensive actions. If the two action tendencies mismatch then weak offensive and defensive actions are possible.

3.2 Emotional Reaction

After the decision the character performs the selected action and both characters react emotionally to the results. The emotional reaction depends on the action itself, its results (e.g. if it succeeded or failed) and on the previous emotional state of the character. Theories like OCC[8] have described appraisal mechanisms that activate emotions on individuals according to event that it perceives. In *FantasyA* the emotion state creates an action expectation on the character based on the action tendency that the emotion has. This means that an angry character expects to attack its opponent, but this is not necessarily true because the action also depends on the opponent emotion. Characters will react differently to the action result if the action taken was within its expectations or not. In the case of failure, characters will react more drastically if the action was within the expectations. On the other hand, if the spell succeeds the reaction will be more enthusiastic if the action was expected (e.g. if the action was expected the character might gloat instead of just being happy). The emotion and the action result define guidelines to reaction rules, as discussed above, but the reaction rules also depend on the particular character's personality.

4 Study and Results

We conducted a study to evaluate *FantasyA* and the *SenToy*. The *FantaysA* evaluation was conducted with 30 subjects: 8 children, 12 high-school students and 10 adults - from ages 9 to 38. The students and children play computer games for an average of 10 hours per week, while adults almost didn't play at all. We ran 15 sessions of 50 to 90 minutes each. The subjects were given two sheets with the game rules, but not with the emotion rules behind the combat logic. The results were obtained from three sources: video observation, open-ended interviews and a questionnaire.

In general the character expressions were well accepted and understood but the more exaggerated were better perceived. On the other hand the game logics seem too complex but some subjects got a few ideas about it as we can see from the following comment:

"I believe that you should check somewhat what the other guy [the opponent] does. What he expresses. [..] Yes, because he is probably expressing the same things as our guy is. Then you react to that. But we did not do that very much. [..]" (adult player)

Regarding the entertainment aspect of the game we were very successful! All subjects were very pleased with the experience and some would even like to buy the game.

"This was a different game, enormously funny!" (adult player) or *"It was a fun game that I hope will be released on the market sometime"* (13-year old)

5 Conclusions

Although the game was a success in terms of how much the players liked it, we were not very successful in making the user's understand the role of emotions in the game. One possible reason may be that the rules of the game are too complex to grasp in the short time given for the evaluation. On the other hand, most of the players performed some kind of mental mapping between the emotional gestures and the behaviour of their avatar, using the gestures to perform certain actions. Although this, at first glance can be seen as a bad result, we do not think so, as the role of emotions was essential for the whole development of the system, more specifically for the belivability of the agents.

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