Using Fuzzy Logic to Model Character Affinities for Story Plot Generation

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In the book *The Thirty-Six Dramatic Situations* [4] Polti explores the assertion made by Gozzi (author of *Turandot*) saying that there can only be thirty-six tragic situations. At the end of the book, he begins his conclusions by saying that, to obtain the nuances of the situations, the first thing he did was to *"enumerate the ties of friendship or kinship between the characters"*. A century before that, Goethe had already proposed his theory of *elective affinities* to depict human relations, specially marriages, and he showed how affinities between characters can be represented by a topological chart [6]. This evidences that the affinity between characters is an important factor to take into account when generating stories, and one that can help us to maintain the necessary narrative tension to keep the reader interested in the story. One of the most relevant research works on the subject is *Thespian* [5]. The authors describe the use of affinity to model social interaction which affects how characters can behave towards each other. Affinity is affected by other factors, such as social obligations and characters goals.

We have developed a storytelling system where we use a numeric representation that allows us to use common arithmetic operators to modify the degree of affinity between characters [3]. The main limitation of this approach is that it is difficult to calibrate the model and interpret what is happening in the simulation. To overcome the limit, we have opted for a representation similar to the fuzzy concepts proposed in [7], an approach that has already been used by other authors to model cognitive architectures [1, 2]. We have modeled four levels of affinity according to four different affinity kinds: foe (no affinity), indifferent (slight affinity), friend (medium affinity) and mate (high affinity). These four levels of affinity overlap on their limits, which allows for relationships not to change constantly when moving around the limits of two different levels. An additional aspect of affinity is the lack of symmetry. Given two characters, their mutual affinity is likely to have different values and it may even be situated in different levels, with the exception of mates: *character A* considers *character B* as its mate only if *character B* considers *character A* as its mate, too. However, if they are not mates, *character A* may think *character B* is a friend, while*character B* may think *character A* is a foe.

There are two ways in which the affinity value can change. The first one is by lack of interaction, in which case the affinity value moves towards the indifferent level. The second

This paper has been partially supported by the project WHIM (611560), funded by the European Commission under FP7, the ICT theme, and the Future Emerging Technologies (FET) program.

one is through interactions among characters, which perform according a hand-written rule set. Each affinity level defines a set of valid interactions. For instance, a character may only propose to carry out friend actions when dealing with a friend. Characters ignore proposals that do not correspond to their perceived affinity level, and receiving such proposals may penalize the affinity with the character proposing them. The exception to this rule are foes, who carry out what they intend to do irrespective of what the other character may want. When receiving a proposal, a character may decide to either accept or reject it. If the proposal is accepted, both characters increase their mutual affinity. If it is rejected, the sender will penalize its affinity with the receiver.

The described model has been implemented by means of a multi-agent system which contains two types of agents: a *Director Agent*, which is in charge of setting up the execution environment and creating the characters; and *Character Agents*, one for each character of the story. They are the ones that interact to generate the story. Currently, the story consists of a set of interactions that make the affinity between characters change accordingly. Each Character Agent is endowed with three different behaviours independent from each other: one to interact with its mate, another one to interact with its friends and the last one to interact with its foes; no interaction is initiated with indifferent characters.

We intend to endow characters with personality traits and emotions, in order to complement the affinity model and give characters the possibility to make decisions in a more cognitive way. We plan to use an approach similar to the one described in [2] to model emotions, so that it can be easily integrated with the present model. This work line is specially relevant, since it will allow characters to make consistent decisions according to the personality and state of mind, instead of random ones, and it will also allow them to behave in a different way from each other.

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