Double Appraisal for Synthetic Characters

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Abstract. The paper describes a double appraisal-based emotion system for synthetic characters. This approach gives intelligent agents the ability to make decisions with respect to the emotional states of others, thus implementing aspects of the theory of mind concept and laying the basis for cognitive empathy.

Keywords: Double-appraisal, Emotions, Synthetic Characters.

This paper describes the implementation of an emotion-based system for synthetic characters to support their use in interactive storytelling as synthetic actors. This work relates to the Emergent Narrative (EN) concept [1, 2] in which the role played by a synthetic character is quite different from that in more traditional plot-based structures given that narrative is generated on the fly by their interactions. The internal structure of characters must therefore include complex autonomous action-selection mechanisms.

This work exploits the hypothesis that the emotional impact of an action stands as a surrogate for its dramatic value and allows the characters to conjointly assume in a distributive manner the dramatic weight of an unfolding story without relying on a pre-determined plot structure. A novel agent action-selection mechanism featuring a double appraisal cycle, as opposed to the single appraisal system of many other appraisal-based agent architectures was implemented within the FAtiMA [3] agent architecture which includes the OCC [4] cognitive appraisal taxonomy.

Cognitive appraisal theory asserts that humans evaluate events, objects and other people in relation to their own goals, and that affective states result from this process depending on whether, for example, an event supports or undermines their goals. FAtiMA [3] implements cognitive appraisal with associated coping mechanisms both for reactive and planned actions

1 Double Appraisal [DA]

[DA] features an action-selection mechanism in which the agent makes decisions based firstly on the emotion associated with its goals, and then secondly also on the emotional impact the action would have if directed at itself. This action selection mechanism adds another invocation of the appraisal process and re-appraises potential actions according to the agent's own set of emotional reactions. The agent uses its

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own set of values to assess how an action is perceived by others to make a choice between competing potential actions. Thus the decision is made as if the action was directed towards the agent itself. In order not to affect the *actual* emotional state of the agent, this re-appraisal cycle is executed in parallel to the "appraisal-coping" cycle and takes place within a second instance of the agent's mind that is not connected with the agent's running emotional state.

2 Double Appraisal with Modelling [DAM]

[DAM] adds another dimension to the re-appraisal approach by actually conducting the re-appraisal with respect to a representation of the emotional reaction sets of all the agents present in a scenario. It aims to select the action that would have the highest overall emotional impact on any character present within the scenario. It considers the impact of actions on each character and picks the one that scores the highest value for some character in the scene.

3 Conclusion

The work reported here was carried out as a first step in implementing a novel story management approach that draws on interactive practices rather than non-interactive theoretical approaches. The "Double-Appraisal" (DA/DAM) approach is an affectively driven action-selection mechanism that exploits the close relationship between emotions and drama in order to generate dramatically interesting events. It links cognitive appraisal modelling to specific narrative functions and drama (i.e. dramatic action-selection mechanism) and specifically integrates bottom-up emergent structures within a character-based narrative framework. It extends characters from the simple playing of their dramatic role into actors that evaluate the dramatic impact of what they do.

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