Synthetic Characters with Personality and Emotion

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1 Introduction

Researchers of systems for Digital Entertainment have resorted to Artificial Intelligence to create characters that are more adaptable to new situations, less predictable, with fast learning capabilities, memory of past situations and a variety of convincing and consistent behaviors.

Recent studies in cognitive psychology and neuroscience analyze the fundamental role of personality and emotions in human cognition, based on the notions of perception, attention, planning, reasoning, learning, memory and decision making. These notions can be characterized as modules in a formal model to describe the personality and emotions of autonomous agents, whose manifestations can be directly dependent upon personality and emotional states. Future research in affective computing must explore how emotions interact with other modules in agent architectures (such as memory and decision making), as well as how emotions influence the interactions with other agents [1].

In this paper we introduce an architecture for the construction of synthetic characters with personality and emotions. This architecture is based on the BDI model, extended with an Affective Module composed by three submodules: Personality, Mood and Emotion, which influences the cognitive activities of perception, memory and decision making of agents.

2 The Architecture

Our architecture has been implemented using Jason [2]. Jason is an open source interpreter of an extension of the agent-oriented programming language AgentSpeak, which in turn is an extension of logic programming for the BDI agent architecture.

We have extended the architecture defined by AgentSpeak to include the Affective Module. The Affective Module is used to influence the other modules, turning the actions of the agent more believable. It is founded on the notions of personality, mood and emotion. Personality is what individuates human beings. It is assumed to be stable, and influential on behavior as well as on the intensity of emotions. In our model we have adopted the model of The Big Five Personality

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Factors [3], whose focus is on description rather than on the understanding of personality. Mood is a state that results from the cumulative effect of emotions and which strongly influences human cognitive functions [4]. Similarly, in our work we use the model defined by Mehabian [5], which divides mood in pleasure, excitement and dominance. Emotion is a state of immediate effect and short duration. It is activated by events, actions or specific objects, and normally influence manifestations like facial expressions, gestures and voice intonation. The model of emotions that we have adopted in our experiments is the OCC model [6].

The influence of personality and emotions in cognitive processes in our model is implemented as relations between these factors and three functions: selection of events of interest, selection of plans and beliefs and selection of intentions.

3 Proof of Concept

In order to evaluate the architecture, we are working on two proofs of concept. The first one is the construction of an agent for the computer game Robocode [7], which is a battle simulation game. With this proof of concept, it will be possible to observe the behavior of each agent and verify whether the personality, the mood and the emotional states influence the way they get information from the environment and in their adaptative choice of actions and strategies.

The second proof of concept will explore the construction of synthetic characters for virtual environments. In this proof of concept, the user will interact with a character in a controlled virtual environment, as proposed in the JamSession project [8]. It shall be possible to evaluate in detail the evolution of affective states and how they affect the cognitive state of agents.

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