Chapter XV

How Synthetic Characters Can Help Decision Making

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ABSTRACT

Synthetic Characters are intelligent agents able to show typical human-like cognitive behavior and an artificially-made perceived personality by means of complex natural language interaction and artificial reasoning and emotional skills. They are mainly spreading on the web as highly interactive digital assistants and tutoring agents on online database systems, e-commerce sites, web-based communities, online psychotherapy, and in several consulting situations where humans need assistance from intelligent software. Until now, synthetic characters, equipped with data, models, and simulation skills, have never been thought as the building blocks for natural language interaction-based intelligent DMSS. This chapter illustrates the first research and development attempt in this sense by an Open Source project in progress centred on the design of a synthetic character-based DMSS.

INTRODUCTION

Synthetic characters are intelligent agents able to show typical human-like behavior by means of natural language interaction (Cheong, 1996; Mauldin, 1994). They are applied successfully in consulting situations, where the human user needs help to solve a problem, e.g., buy a product, choose an article, decide among two or more options in a business, understand or frame an ill-defined problem, and so on.
Those kind of intelligent agents are common both as support systems on e-commerce Web sites or in Web-based communities (Lesnick & Moore, 1997; Norman, 1998) and as consultants on psychotherapy programs (Weizenbaum, 1976). All those applications of synthetic characters are framed within a typical consulting process in a problem-solving situation involving humans (Turkle, 1996).

Up to now, synthetic characters have never been thought of as building blocks for natural language interaction-based DMSS. The power of such models as support systems to help human decision making is being explored in our open-source research project currently under development by our information technology company.

The process inside this DMSS of new conception is quite simple. First, the synthetic character enables a sort of brainstorming between it and the human decision maker by a questions-and-answers natural language interaction, e.g., a conversation. This interaction helps the user to frame the problem and assign variables, decision factors, weights and scores to a hybrid multifactorial decision model which integrates features of decision tree models and Bayesian networks. Second, the synthetic character instances a decision making model or recovers a similar example previously stored in its knowledge base for that decision problem and designs scenarios for simulations through the interaction with the user. Finally, simulations are performed and the decision making process can be modified after an analysis of results by the user and the synthetic character together, redefining elements either of the scenarios or of the model designed with a new brainstorming phase.

The main purpose of this chapter is to describe a new kind of DMSS based on synthetic characters, which represent an interesting and promising research field within the intelligent agents domain. We will briefly discuss how decision making can be supported by a particular highly interactive kind of intelligent agent, namely, synthetic characters. We will introduce an overview from intelligent agents toward synthetic characters in agent-based support systems. We will also discuss general characteristics of decision making modeling and the architecture and processing flow of DEMON (DEcision Making Organizer), the decision support agent we are developing. Finally, we will draw some concluding remarks.

**AGENT-BASED SUPPORT SYSTEMS**

Autonomous agents are computational systems that inhabit some complex, dynamic environment, sense and act autonomously in this environment, and by doing so realize a set of goals or tasks for which they are designed (Maes, 1994; Wooldrige, 2000). Autonomous agents can take many different forms, depending on the nature of the environment they inhabit. If the environment is the real physical environment, then the agent takes the form of an autonomous robot. Alternatively, one can build 2-D or 3-D animated agents that inhabit simulated physical environments. Finally, so-called bots, software agents or interface agents, are disembodied
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