

Chapter 11

Intelligent Agents with Personality: From Adjectives to Behavioral Schemes

François Bouchet
McGill University, Canada

Jean-Paul Sansonnet
LIMSI-CNRS, France

ABSTRACT

Conversational agents are a promising interface between humans and computers, but to be acceptable as the virtual humans they pretend to be, they need to be given one of the key elements used to define human beings: a personality. As existing personality taxonomies have been defined only for description, the authors present in this chapter a methodology dedicated to the definition of a computationally-oriented taxonomy, in order to use it to implement personality traits in conversational agents. First, a significant set of personality-traits adjectives is registered from thesaurus sources. Then, the lexical semantics related to personality-traits is extracted while using the WordNet database, and it is given a formal representation in terms of so-called Behavioral Schemes. Finally, the authors propose a framework for the implementation of those schemes as influence operators controlling the decision process and the plan/action scheduling of a rational agent.

DOI: 10.4018/978-1-4666-1628-8.ch011

INTRODUCTION

Context: Intelligent Agents for Assisting Human Users

Intelligent agents are autonomous software entities, which perceive their environment and acts on it to accomplish their goals. Among elements of the environment of such agents are human beings. Some categories of agents have been more and more in interaction with human users, sometimes becoming themselves the interface between the users and the system they want to use. Those are called the *conversational agents* (Maes, 1994; Cassell, Bickmore, Billingham, Campbell, Chang, Villiamsson, & Yan, 1999), and as many tend to be there to provide them with some kind of *assistance*, we'll therefore focus here on this subcategory of agents that are the *intelligent assistant agents* (further referred to simply as *agents*). In that kind of situation, three entities are in bilateral interaction (a human user U, an intelligent assistant agent A, and a computer system S), where the user performs some activity on/with the system, and, at times, they can solicit the agent for general advice or for direct help upon the system or the task at hand, in which case the agent might have to interact with the system directly, on behalf of the user. In such a situation (further called a UAS situation), one can see that agents need to be both able to interact with:

- A symbolic model of the application and a rational reasoning capacity about that model. In the following, we will refer to this part of an agent as the "*rational agent*." Actually, intelligent assistant agents should be able to interact with a system in the same way as autonomous agents achieve practical reasoning, in order to perform tasks in a given environment.
- The user, which requires: a) a conversational interface, which is often multimodal; b) processing, in a rational way, the input

of user's requests in order to produce as output factual replies c) expressing the answers in a way that would look and sound similar to how a human being assisting the user in the same task would.

Personality Traits for Agents: Why and How?

That last point requires taking into account what we know of the cognitive processes of human beings, in order to mimic it in a software agent. It means that it is not enough for an agent to be *technically competent* thanks to their symbolic reasoning capacities: they also need to be *psychologically relevant*, to be acceptable (in the sense of Davis, 1989), especially when they deal with people of the general public. One of the key points to ensure the consistency of an agent in the way it will provide information to the users is for it to be given what makes a human being follow the same usual patterns of behavior and emotions: *personality traits*. Having agents with personality traits is also particularly interesting in order to try to provide different kind of assistance strategies, which could be adapted to the personalities of the human users.

Those considerations led us to propose a framework dedicated to the study of the nature of the relationships between the rational and the psychological reasoning capacities: the Rational and Behavioral architecture (R&B), where "behavioral" has the particular meaning of "psychological behavior," and which can be found at <http://www.limsi.fr/~jps/research/rnb/rnb.htm>. R&B is a generic framework enabling the computational definition and the experimentation of various rational/psychological strategies. In recent work based on R&B (Sansonnnet & Bouchet, 2010), we have proposed a model where psychological phenomena, such as personality traits, are implemented in terms of influence operators altering the rational process of an agent. Presently, the proposed model has been implemented only with

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