

Artificial Personality and the Need to Include the Observational Perspectives More Centrally in the Research Agenda

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Abstract

In this paper, the social constructivist's dramaturgical model of personality is used to define the field of artificial personality for embodied agents. The dramaturgical model views personality from three perspectives: that of the actor (which is concerned with the internal organization of personality and its expression), that of the observer (which is concerned with the perception and interpretation of personality), and that of the self-observer (which is concerned with the management of self-presentations). Not only does the dramaturgical model of personality shed light on current research concerns and problems in artificial personality but, because it includes the observational perspectives, it also points out new directions for exploration.

1. Introduction

Personality has many facets, as a glance at the psychological reference literature confirms. One major concern in the field of artificial personality is defining and isolating those aspects that are of central importance for modeling personality for embodied agents. On the one hand, models of personality for embodied agents need not be as comprehensive and as accurate as psychological models of personality. The concern in artificial personality is mostly with characterization, not psychological fidelity [1]. On the other hand, embodied agents differ significantly from traditional media-based characters in ways that make endowing embodied agents with a convincing personality problematical.

Is there a theory of personality that can inform and guide research in the field of artificial personality? Numerous psychological theories have been employed

in the development of personality systems for virtual agents. Although psychological theories of personality reflect a variety of underlying assumptions about human nature, most share three assumptions. First, they assume that a person is in possession of a personality. Thus, the fundamental unit in the study of personality is the individual. Second, personality is seen as arising from within a person. It is the product of such internal factors as drives, consciousness, traits, and genetics. Third, it is assumed that personality shapes both the behaviors and the experiences of a person [2].

To view personality almost exclusively in terms of the person follows naturally from the Western emphasis on individualism [3], but it is not the only perspective available. Alternatively, personality can be conceptualized in terms of a collective interpersonal process [4]. The social constructivists in particular acknowledge the importance of a social component in the formation of personality. They believe that personality is not only the product of a variety of internal factors but also a social construction composed of informal lay notions. This inclusion of a lay or social perspective is recognized by the constructivists as providing more than a new theoretical vantage point; it literally represents a *separate observational standpoint* from which to view personality, one that originates from outside the individual [4]. To stress and to illustrate these different standpoints, the social constructivists offer a dramaturgical model that defines personality from three perspectives: that of the actor, that of the observer, and that of the self-observer [4].

The perspective of the actor involves everything associated with the development of individual personality and the ways in which such internal factors as genetics, personality traits, and personal experiences influence

behavior and attitudes. The perspective of the observer deals with the interpretation of personality as it is inferred from an actor's behaviors, appearance, and possessions. The perspective of the self-observer concerns the actor's ability to consciously ascertain and manage the impressions his personality makes on others. For actors to adjust their presentations to accommodate the observer requires an ability for imagining and assessing the impact personality presentations have on others. The constructivists claim that all three perspectives are equally important in the social construction of personality.

The dramaturgical model of personality is particularly suited to understanding how artificial personality can be constructed in the course of social interaction.

Research in artificial personality has primarily been centered on the actor. In the last decade numerous advances have been made in the design of embodied agents that are capable of communicating personality through a variety of expressive modalities. In these systems personality originates within the agent as attitudes, drives, desires, and character traits. These personality components are then used to constrain emotional intensities, modify behaviors, and guide both goal selection and strategies [5].

In section 2 of this paper, a brief outline of research in artificial personality stemming from the perspectives of the observer and self-observer is presented. Unfortunately, the observational perspectives have virtually been neglected—this despite repeated acknowledgements that the user plays a vital role in creating the illusion of personality for embodied agents.

A main contention in this paper is that the research community should include the observational perspectives more centrally in its research agenda. As noted in section 3, there are serious drawbacks with the current one-sided focus on the actor. Offsetting this imbalance by emphasizing the observational perspectives would resolve some of these issues.

2. Artificial Personality From the Perspective of the Observer

In the last decade there has been an ongoing shift in focus away from the perspective of the actor towards the observer. Bates [1] and Laurel [6] have led the way by taking inspiration from the arts. Laurel uses the metaphor of a theatre in her discussions of interface agents. This metaphor includes an audience along with an actor. Bates has examined how Disney animators breathe life into their characters in an attempt to understand what makes them believable, and Disney animators are concerned less with realism than with the impression of realism. An often repeated theme in the arts is that what matters in the portrayal of character is the response of the audience.

In a similar vein, Isbister [7] has advanced the observational perspective in her research on intelligent agents by noting that the *perception* of intelligence is as

important as the inner workings of a brain. But it is Churchill et al. [8] and Castelfranchi, de Rosis and Falcone [9] who have explicitly introduced the observational perspective in artificial personality. Churchill et al. [8] have even used Hampson's metatheory of personality to outline their approach. They have proposed that their agents pass the "lay personality psychologists test." Likewise, Castelfranchi, de Rosis, and Falcone [9] have noted that personality is both *generated* and *recognized*, but they have gone beyond merely recognizing the role of the observer to actually developing agents that are capable of assessing the personalities of other agents.

Having an agent observe another agent's personality, however, is only one possibility. There are two others: an agent can observe a user and a user can observe an agent.

2.1 Agent Observing Agent

In any given situation, a rational agent decides to behave by reasoning about its own mental states, or first order beliefs and goals. A socially intelligent agent considers as well the states of other agents, or second order beliefs and goals. To interact in humanlike societies, to form relationships, and to have satisfying social encounters, agents need to reason about other agents.

Castelfranchi, de Rosis, and Falcone [9] have extended the reasoning of agents to include the personality of other agents. They have developed, for instance, a multiagent system called *GOLEM* where agents, in addition to having a number of social capabilities, have distinct personalities. In the world of *GOLEM*, agents reason about the personality of other agents by observing their actions. Knowledge of an agent's personality is strategically useful in abducting an agent's plans and capabilities.

2.2. Agent Observing User

Embodied agents, by the very fact that they are embodied, are expected to behave in socially appropriate and intelligent ways. Successful social interaction with a user requires that an embodied agent observe and respond to the user. At the very minimum, the agent must keep track of the user's location in order to direct its gaze appropriately when speaking. Truly satisfying social interactions, however, require that embodied agents do more than physically track people.

One area of intense interest is in the development of embodied agents that recognize the user's emotional expressions. Only recently, however, have embodied agents been designed to recognize a user's personality. Ball and Breese [10] are the first to have explored this possibility. Their systems recognize a number of emotions and personality types as these are expressed along two dimensions: dominance, measured by a user's disposition towards controlling or being controlled, and friendliness, measured by a user's tendency to be warm and sympathetic.

By and large, Ball and Breese have concentrated on recognizing personality through language. Within a Bayesian network, the following user behaviors are represented: paraphrase selection, base pitch, pitch variability, speech speed, and energy. The exact input settings that reflect different personality types and emotional expressions are predetermined by the investigators, whose decisions are informed by psychological studies that have examined personality and emotion as it is expressed in language. The researchers also mention that their systems are capable of recognizing visual indicators of emotion and personality, as revealed, for example, by posture and emotional facial expressions, but thus far no details have been presented regarding this aspect of their systems. Nonetheless, the program they outline takes a good first step towards furnishing an agent with an observational model of a user's personality.

2.3. User Observing Agent

It is generally recognized that users respond to computers as social entities—that **Computers Are Social Actors (CASA)** [11]. The CASA paradigm claims that any social science finding which concerns human-to-human attitudes or behaviors holds for human-to-computer interactions [12]. There is now ample evidence in support of CASA.

Noting the importance of personality in traditional media and psychology, Nass et al. [12] have applied the same methodology in determining how users judge and behave with interactive computer characters that exhibit personality. In one study, both verbal and nonverbal cues (posture, body movement, word choice, and sentence structure) indicative of extroversion in human beings were displayed by embodied agents. Their subjects had no trouble successfully labeling the introverted and extroverted cues exhibited by the interactive characters. Nass et al. have also found that users respond to the personalities of computers in predictable ways. Just as people prefer others who have a personality that is similar to their own, so users prefer a computer with a complementary personality [11]. Users are also attracted to computer interfaces that exhibit the same traits that make people more agreeable. Computer interfaces that flatter, for instance, are particularly liked [11], as are computer interfaces that exhibit a sense of humor [13].

3. Artificial Personality From the Perspective of the Self-Observer

As noted in the last section, the evidence is overwhelming that the human-computer relationship is fundamentally social, and the more the computer interface is embodied, the more it is expected to behave in socially appropriate ways. [10, 11, 14]. Insofar as the expression of personality is concerned, most people adjust their presentations to accommodate the personalities

and needs of others as well as to fulfill the requirements dictated by social roles. Are embodied agents expected to conform to this practice as well? Reeves and Nass have produced strong evidence in support of such a claim. They find that interfaces that attempt to adjust their presentations to suit the personality of individual users are consistently judged more favorably. Even in situations where the agent fails to produce the desired effect, as long as it exhibits an inclination to adapt, users give it credit for trying [11].

Research that explores the adjustment of an embodied agent's personality in social settings—as with research stemming from the observational perspectives in general—is sparse. But the need for such research is evident. In the human-computer interface community, one area of research activity concerns user interface preferences. It has been found, for instance, that users are affected differently by animated agents [15]. Resnick and Lammers [16], for instance, have shown that users with low self-confidence are more likely to need a humanizing interface.

Few, however, have attempted to incorporate real time observation of the user in the development of embodied agents that then adapt their personalities to suit the user. Ball and Breese [17], as noted above, are the first to have developed embodied agents capable of diagnosing the user's personality.

Likewise, De Carolis, de Rosis, and Pizzutilo [18] have experimented varying their agent's helping style based on the user's personality in several of their documentation systems. In their systems, adaptation to the user is based on personality-related conditions that trigger either a task-oriented approach or an object-oriented approach. As with Ball and Breese, De Carolis et al. have yet to evaluate the effectiveness of their system.

4. Problems With Current Research and the Need for the Observational Perspectives

In the development of artificial personality, it is essential that the observational perspectives be taken into account. Focusing solely on the perspective of the actor at the expense of the observational perspectives causes problems and limits possibilities. That this is so is evident in the current state of affairs, where many troublesome issues are a direct result of a one-sided concentration on the actor.

One problem that arises when the observational perspectives are not taken into consideration is the production of agents that are inflexible in their personality expressions and insensitive to the personality presentations of others. As the dramaturgical model of personality illustrates, personality is a social construction that combines an actor's performance and presentation with an observer's impressions of that presentation. Personality, in other words, is the product of a negotiation process [2]. Socially adept agents, like so-

cially adept people, must know how to adjust their personalities when needed.

But perhaps the most serious problem today concerns evaluation methodology, or rather a lack of it. Many have noted that system assessment is more often than not overshadowed by the eagerness of developers to describe their systems and to unveil their agents [12, 18]. Typically, an evaluation of the effectiveness of these systems is left to some future study or reported anecdotally. In those cases where an evaluation study is conducted, it is oftentimes unclear what precisely is being assessed. This is especially the situation with personality authoring systems. When users judge the personality expression of a given agent, for example, one may well wonder whether the user is actually evaluating the system as a whole or whether the user is evaluating the talents of an individual author using the system.

To a large extent, the problem with system evaluation boils down to the fact that standard experimental research protocols are not being employed [12]. Proper evaluation requires an assessment of user responses to multiple embodied agents, and in the case of authoring systems, embodied agents created by more than one author.

The key idea here is that *proper evaluation requires the inclusion of the observer*. What is essential to realize is that this oversight on the part of researchers in evaluating their systems reflects more than an overriding enthusiasm for agent development: it reveals once again that what is not being fully appreciated is the vital part the observer plays in the *construction* of personality.

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