When Etiquette Really Matters: Relational Agents and Behavior Change

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Introduction

Etiquette is about adhering to prescribed norms in social interactions, or about negotiating and making explicit interactional norms when they do not already exist. While these play a role in most realms of human interaction, the establishment of such norms has been demonstrated to be especially crucial in domains in which a person is attempting to undergo a change in behavior or cognitive or affective state. In the field of psychotherapy, the construct of *working alliance* has been demonstrated to have a significant correlation with outcomes across a broad range of therapies, and has been hypothesized to be the single common factor underlying the therapeutic benefit of therapies ranging from behavioral and cognitive therapies to psychodynamic therapy [6].

The working alliance is one dimension of the relationship between the therapist and patient, based on trust and belief in each other as team-members in achieving a desired outcome [4]. The working alliance has three sub-components: a goal component (the therapist and client agree on the goals of the therapy); a task component (the therapist and client agree on the therapeutic tasks to be performed); and a bond component (reflecting the trusting, empathetic relationship between the client and therapist). The alliance is thus a change-inducing relationship in which the interactional norms (goals and tasks) have been made explicit and are understood and agreed to by both the therapist and the patient.

Relational Agents

What would it mean for a computer agent to establish a working alliance with a user? This is just one of many possible application areas for Relational Agents, which are computational artifacts designed to build and maintain long-term, social-emotional relationships with their users [1]. These can be purely software humanoid animated agents, but they can also be non-humanoid or embodied in various physical forms, from robots, to pets, to jewelry, clothing, hand-held, and other interactive devices. Central to the notion of relationship is that it is a persistent construct, spanning multiple interactions, thus Relational Agents are explicitly designed to remember past history and manage future expectations in their interactions with users. Finally, relationships are fundamentally social and emotional, and detailed knowledge of human social psychology--with a particular emphasis on the role of affect--must be incorporated into these agents if they are to effectively leverage the mechanisms of human social cognition in order to build relationships in the most natural manner possible.

How could a computer agent go about building a working alliance with a user? In addition to the general rapport building strategies of small talk and getting acquainted talk, the relational factor that is most often mentioned as crucial in forming and maintaining the working alliance is the patient's perception of the therapist's empathy for them [4, 5, 8]. Thus, conversational strategies for identifying the patient's emotional state must be developed in addition to the generation of appropriate empathetic responses. Preliminary work in this area was done by Klein, who demonstrated that a very simple computer agent could indeed provide effective empathy for a frustrated user, and could use this empathy to alleviate the user's negative affective state [7]. In addition to empathy, the tasks and goals to be performed in the therapy must be made as explicit as possible, reviewed regularly, and tied back the top-level goals of the client.

Research on Relational Agents has focused on the role of social dialogue in service encounters--specifically real estate sales--and how this dialogue is used by the sales agent to build trust with his or her clients. As part of the REA system--an Embodied Conversational Agent who plays the role of a real estate salesperson--a dialogue planner was developed that produced appropriate social dialogue at key points in the conversation based on a multi-dimensional relational model [2]. Current work extends this model to the domain of health behavior change, with a focus on building an effective working alliance with clients over a long duration of time. This domain was selected because there are many well-understood, brief duration techniques for effecting health behavior change, many of which have already been computerized [3, 10, 11]. Further, effective health behavior change is of direct benefit to subjects, and some target behaviors--such as

exercise adoption--are particularly relevant to the college population that typically comprises the subject pool for human subjects experiments [9].

Exercise Advisor

The Relational Agent developed for this latest work promotes exercise among MIT students (see Figure 1). A two-month longitudinal study is currently being conducted, in which subjects interact with the agent daily during the first month. The three treatments in the study compare current state-of-the-art behavior change interventions (control group) with treatments in which an Embodied Conversational Agent has been added to the interface, with and without the use of techniques designed to foster a working alliance between the agent and its clients.

This study is expected to demonstrate that people not only respond socially to computers in superficial ways, but can respond and interact in much more substantive and significant ways--as partners emotionally engaged in a persistent relationship--and should provide insights into how individuals can live and work with software agents over extended periods of time, and what these agents must represent about past and future interactions in order to make these extended relationships natural and useful.

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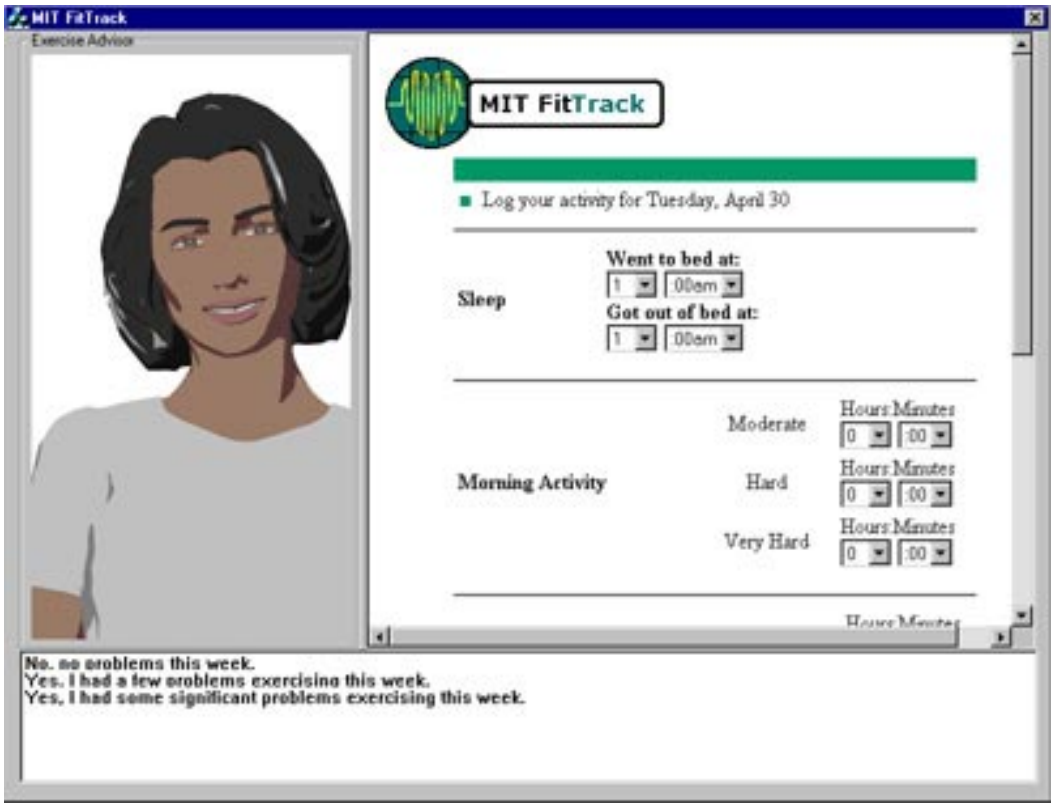

Figure 1. Exercise Advisor Interface