Chapter 3.4
Importance of Interface Agent Characteristics from End–User Perspective

Alexander Serenko
Lakehead University, Canada

ABSTRACT

This article reports on an empirical investigation of user perceptions of the importance of several characteristics of interface agents. Interface agents are software entities that are incorporated into various computer applications, including electronic mail systems. As evidenced by the growing body of empirical studies and the increasing number of interface agent-based applications on the software market, there is a strong need for the development of this technology. According to a meta-review of agent-related literature by Dehn and van Mulken (2000), there are several characteristics of interface agents that require special attention from agent developers. However, prior to this study, the importance of these characteristics from the end-user perspective remained unclear. In order to identify the significance of these characteristics, a group of actual users of an e-mail interface agent was surveyed. The results indicate that information accuracy and the degree of the usefulness of an agent are the most salient factors, followed by user comfortability with an agent, the extent of user enjoyment, and visual attractiveness of an agent. The implications of the findings for both theory and practice are discussed.

INTRODUCTION

To create an artificial being has been a dream of men since the birth of science. Professor Hobby (William Hurt) in "Artificial Intelligence" (Spielberg, 2002)

For thousands of years, people have thought of someone doing basic tasks for them. That could be a robot, a cyborg, or a well-trained pet. Not until the beginning of the 21st century did it become possible. Now, with the recent development of telecommunications networks and computer technologies, a new type of software application plays the role of virtual assistants that potentially may alleviate some of the problems associated with the employment of software systems. This class of applications often is referred to as intelligent agents, software agents, avatars, or interface agents. As demonstrated by the growing body of academic literature and by the increasing number of agent-based software applications on the market, there is

increased interest in the creation of such software entities. In this article, these software systems are labeled as interface agents.

Interface agents emerged from the recent developments in the field of intelligent agents. The idea of software agents was first introduced by John McCarthy (1956, 1958) and later coined by the MIT Lincoln Laboratory computer scientist Oliver Selfridge. In the 1980s, this concept was explored by agent visionaries such as Marvin Minsky and Alan Kay and further utilized in the recent classic works of Pattie Maes, Nicolas Negroponte, Jeffrey Bradshaw, Hyacinth Nwana, and Divine Ndumu. The past few years have witnessed the rapid development of prototypes and working models of intelligent agents, many of which already are incorporated in end-user commercial applications. A number of recent studies demonstrate the fruitfulness and viability of using agent-based technologies in various areas; for example, in automatic negotiation (Castro-Schez et al., 2004; Fatima et al., 2005), natural-language customer support services (Lester et al., 2004), education (Takacs, 2005), and user notification systems (Horvitz et al., 2003). Some academics have shifted their research from human-agent interaction to human-agent cooperation (Rickel & Johnson, 2000; Rickel et al., 2002) and man-machine symbiosis (Klein et al., 2004; Lesh et al., 2004; Lesh et al., 1999), when the human user and the software agent collaborate toward achieving shared goals.

In terms of this article, an interface agent is defined as an autonomous (i.e., independent), continuous (i.e., long-lived), reactive (i.e., it monitors an external environment and reacts to any changes), and collaborative (i.e., it cooperates with other software processes or agents) software entity that exhibits strong visual or audio presence in the computer interface and that communicates with a user directly (i.e., by bypassing intermediaries) (Detlor, 2004; Lieberman & Selker, 2003; Serenko & Detlor, 2004). "Interface agents draw their strength from the naturalness of the living-organism metaphor in terms of both cognitive accessibility and communication style" (Laurel, 1997, p. 68). Typically, interface agents are personalizable and implemented in the form of humanlike or cartoonlike animated characters, electronic figures, graphical user interfaces, textual boxes, or any other visual components (Godoy et al., 2004; Schiaffinoa & Amandi, 2004).

Having the available agent technology is insufficient; it also should be accepted and utilized appropriately by its target users. For the past 10 years, there have been various attempts to understand what people like or dislike in interface agents and why they adopt or reject them. The goal of this stream of research is to develop a valid, complete list of characteristics that interface agents should possess that would warrant the end-user acceptance of this technology.

By performing a meta-analysis of the human-computer interaction literature, Dehn and van Mulken (2000) presented a comprehensive yet exhaustive list of characteristics of interface agents that potentially may influence the human-interface agent interaction process. Most of these characteristics are drawn from various independent investigations conducted in laboratory settings. At the same time, no study reports how real-life users value the characteristics of an interface agent-based technology. In order to bridge that void, the present investigation attempts to solicit and to analyze the opinions of interface agent users on several key characteristics of the technology. It is assumed that this information potentially may improve the quality of the technology and the way it is delivered to the customer. For example, if agent manufacturers could know what interface agent characteristics are more or less important for users, they would be able to concentrate their short-term efforts to improve positive user perceptions of these characteristics. This, in turn, might increase user satisfaction with agent-based technology and accelerate the rate of innovation diffusion.

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