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Configuring Social Agents

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ABSTRACT

Social agents have recently been more frequently used in the user interface. However, so far not many studies have been conducted on what impact such interfaces have on users behavior. This paper discusses this and reports on empirical findings, which focus on impact of social agents on user behavior. We talk of *social agents* as interfaces that act autonomously but are related to the actions of the user. However, to really figure out what social impact these interfaces have on humans, we discuss what characteristics of social agents that should be possible to configure, in order to establish, maintain and develop a fruitful relation with the user. In order to do so, we needed to explore the impact for real users. The exploration of the impact of social agents such as BonzyBuddy the Parrot and Bob, the Paper-clip guy, was done empirically through observations and interviews with users. Based on empirical data collected in the study, a user-agent interaction model was constructed. The model illustrates three dimensions for configuration of social interfaces. Given the interaction model the two agents investigate are discussed followed by a discussion on what implications these observations has for design of social agents. Having identified the need for self-examining and self-adapting social agents and related problems we then conclude the paper and points at some future work.

1. Introduction

Social agents are applications that act both autonomously and on behalf of the user. They are becoming more and more common (Jensen, 2000). The purpose of social agents is twofold. Social agents should help users perform meaningful tasks. At the same time a social agent should be joyful and pleasurable for the user to interact with, a situation not always compatible with traditional approaches in HCI (e.g. Jordan, 2000; Olsson, 2000; Picard, 1998). Since there is an autonomous part of these agents the relation between help and fun can turn into a paradoxical situation if the relation between the user and agent is not configured properly. To grasp what kind of configuration is needed to avoid this paradox empirical research is needed on how social agents influence users and what users expect from their electronic pals. This paper deals with the question of what kind of impact social agents have on users and how that knowledge can be fruitfully reframed into a model of how social agents should be configured to enable the establishment, maintenance and development of a sound relation to users. The rest of this paper is structured as follows: First, the concepts of social agents is outlined followed by a brief description of two applications, BonziBuddy and Bob. After that an empirical study of the use of BonziBuddy and Bob and their impact on users is described, followed by a summary of the main findings concerning the use of the social agents. Finally, a social agent interaction model is outlined, based on the empirical findings. Our intention with the developed model is that it could provide designers of social agents with a tool to think about how to allow users to configure their relation to their social agents. Future work includes the design and evaluation of a social agent that is built according to the model. Hopefully, that work can give more insights on fruitful ways to design social agents that can be configured by the user in a manner so that a fruitful relation can be established, maintained and developed.

2. Social agents

In the following discussion the term social agents refers to applications that are focused on the experience and enjoyment of the user. Instead of supporting a specific task related to work, social applications focus on the satisfaction of the user. This type of applications is mostly related to, what we call, *interactive intelligent agents*. The term *agent* is very broad. A more specific definition of the concept of *software agent* is given as follows:

"[Agents are] ...semi-intelligent computer programs which assist a user with the overload of information and the complexity of the online world." (Schneiderman & Maes, 1997)

The difference between interface agents and other type of applications is mainly their ability to act autonomously on behalf of the user in different situations (Dehn & van Mulken, 2000). Also, intelligence is something that relates to some of them (all of them, according to Dehn & van Mulken, 2000). Intelligence, according to Dehn & van Mulken, is related to their ability to perform tasks delegated to them in a context- and user-dependent way. Mainly, what we put in this category are agents, that are (1) intelligent, in that they are aware of the user's activities, and (2) interactive in the sense that users are aware of their existence on the screen. The last point excludes, for instance, agents that work as background processes, without user's knowledge, as for instance the feature in Word 2000 that keeps track of your menu choices and changes the menus from this.

Examples of social agents are *Bob, the Paper-clip guy*, his 'Mac-Cousin' *Max*, and *BonziBuddy the Parrot*, as well as other interactive assistants and pets. The examples of this category are numerous and also, the number of them are growing on the web. The purpose of these types of applications seems twofold; (1) to help and assist in the performance of the users activity, and (2) to do this in a social and more or less, enjoyable way. By this we mean that the 'feature' acts in such a way that, for instance the help should be helpful *and* fun. These two social agents are further described below:

BonziBuddy - the Parrot

BonziBuddy the Parrot is an application easily downloaded from the web. This is an example of a social agent that tries to combine different types of input and output. BonziBuddy uses gestures and pet-like moves, as well as sound to call upon your attention in different situations. The pet metaphor is obvious and can help you to surf on the web, tell you jokes, read your e-mail to you and do all kind of 'tricks'. He can keep the user occupied for hours if the user so chooses. Also, there are more features added all the time and more songs, jokes and so on to buy from the software company that has the rights of *BonziBuddy*.

There is an uncertainty about how autonomous *BonziBuddy* is. Information in the application itself tells you that the parrot for instance is able to learn patterns in your web surfing, and predict how you would rank choices of web sites. All this based on your earlier surfing patterns. However, whether this is the case or not is questionable. The parrot gives a quite personal impression though, due to the fact that it repeatedly calls you by name, as you have printed it into the application.

Bob - 'the paper-clip guy' and Max - his Mac-cousin

This agent is wide spread and known all over the world as a person-like paper-clip moving on screen when one uses *MS-Word*. It is a part of the help system in the application. It is not as noisy and messy as the parrot described above, but there are some similarities between the two. The similarities are that they are both person like and that they are animated. *Bob*, however, is more connected to the specific activities in a single application though, while the parrot is more of a social agent not specifically connected to a specific application.

The appearing social agent is the default choice when downloading the application. However, the feature is easy to take away and there is also some ways in which the user can customize the social agent. In general, this agent is more anonymous on the screen compared to the above-mentioned parrot.

3. Empirical study

The study lasted for 3 months, and it was conducted by use of participant observations and semi-structured interviews. The number of users in the study was all together ten. The main purpose of the observations was to investigate the user-agent relation. The purpose of the interviews was to get a more genuine and longitudinal view of the whole process - from downloading to finally end of usage of the agent. Another strong reason to use interviews is to collect the rate of the subjective satisfaction, and then interviews could be a proper choice (Nielsen, 1993, p. 209 ff.). The users in the study could be divided into two groups; (1) users that voluntarily downloaded the application, and (2) users that got the application when buying or downloading other types of applications or visiting web sites with attached 'social' features. In the study, both types were represented. Our intention of using both types of users was initially to find two types of sets of aspects. However, so far, the indications from studies show that there are mostly the same results coming from the two groups. The spectrum of findings are, of course, wide, however there are some significant findings to extract. These are related to a timeline of usage.

The timeline could be divided into three stages. (1) *The phase of acquaintance*, when the social application either were downloaded or followed another application. (2) *Maturing phase* where the user tried and elaborated with

the social application, and finally (3) *End phase* which occurred in those cases when the second phase had resulted successfully, i.e. the user had accepted the existence and functionality of the companion.

Results

Below we outline three identified phases of the user-agent relation (i.e. The phase of acquaintance, the Maturing phase, and finally the End phase).

Findings related to the timeline are first surprise. The users report on moments when they giggled surprised when the feature did something. On the question of how to measure the social agent in this phase, autonomy came up. This aspect was very important in the first phase.

"Why I started to use it at the first place? Because it was cool and that it surprised me! I was laughing at the screen and I had found myself a new friend. I felt as he was a completely autonomous feature. It was really fun!"

Second, findings from the second phase show that elaboration and number of embedded features were of importance.

"I wanted to test what BonzieBuddy could do. They said that he had build in intelligence in what I searched for on the web. I tried to find out if and how that worked "

Finally, in the last phase, if this occurred at all, aspects as easily used features for shutting of, quieting down and putting the application in the back of the screen were of importance.

"I still use the feature [in this case a virtual pet]. I tend to give him less attention nowadays though... However, one good feature is his sleeping mode, in which he relaxes if I do not give him any feedback. Also, the sounds in the application is now turned off"

In the cases where the last phase did not occur, situations of disappointment of the application in one way or the other were often reported.

" I stopped to use the paper-clip guy when it couldn't understand my questions that I typed into the field. The commercials said that I could ask questions as I talked. That did not work so I found no use of him. He was just in my way."

5. A user-agent interaction model

Based on our collected empirical data, an agent interaction model was constructed. The model illustrates the relations between a user and his/her agent. Hopefully the model can serve as a basis for discussing possible configurations of agents. Given the three identified phases above a social interface needs to be configured on at least three different dimensions to establish, maintain and develop a fruitful relation with the user. These three dimensions include a *distribution* dimension, an *access* dimension, as well as a *filtering* dimension. As stated by the quote above from phase 1 *distribution* was important (e.g. the agent should reach out and surprise the user, suggest things, play a song, etc and be very entertainment. In the next phase however, the entertainment requirements were exchanged for features more related to the task that the user tried to perform. In this phase the user needed *access* to certain information and be able to quickly find relevant web pages etc. As a consequence the interface does not need to be much entertaining in this phase. However, ease of use is very critical. Finally, as phase three illustrates it is important that the agent can adopt of the way that the user wants to interact with the computer (e.g. through some kind of defined *filters* for the interaction), otherwise it will just be time consuming and not used at all. The figure below illustrates how these three dimensions can be plotted in the user-agent relation.

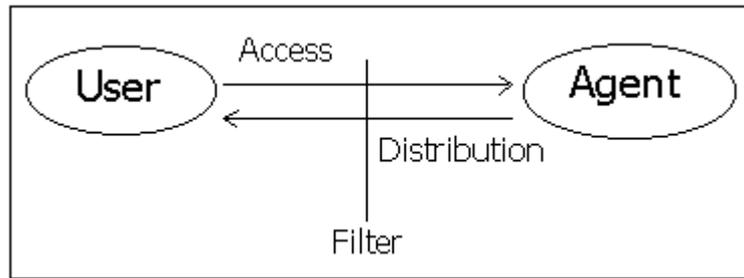


Figure 1: The interaction model based on the empirical findings.

Related to the two agents described we, based on the model above, assumes that *BonzyBuddy* could be much more used if filtering of different kind could be implemented. As some users find the social agents loud speaking and even disturbing in some situations they could gain from customization of sound in a transparent way.

BonzyBuddy also provides some features concerning configuration of the distribution level by allowing the user to install add-ons to the agent. However, how the user is able to access the agent is not configurable. Bob, on the other hand is much more low on the agency scale and is not as critical as the parrot. However, in order to give the paper-clip more status and intelligence, the filtering might be the most critical of the three aspects. If the user should trust the paper-clip to be of more help than it is today and carry specific information about the user, filters for how the agent access information about the user must be in the control of the user.

7. Implications for design of social agents

As the phases identified suggest a user-agent relation grows over time. Given the three phases outlined and the dimensions presented in the interaction model we therefore suggest that social agents should be able to analyze their own interaction history with their user and then self-adapt their way of interacting with the user accordingly. For instance, when the user-agent relation is in phase 1 the agent could be very active. Then, as the phases pass along the agent could transform to be more task-oriented. However, this suggestion also opens up questions concerning if and how the user then should be able to trigger the agent to be regressive and go back one or several phases (i.e. the question of levels of autonomy of agents). One way of doing that, of course could be to let the user define a current state in the relation as a mode and then be able to shift back to that mode whenever appropriate.

8. Conclusions and future work

We have identified three phases of the user-agent relation. Based on these phases we have constructed a user-agent interaction model. Given the developed model and the phases of the user-agent relation, a social interface needs to be able to analyze its own interaction history with the user and then self-adapt their way of interacting with the user accordingly. As stated before, this opens up new questions concerning levels of autonomy of social agents. Future work includes design and evaluation of a social agent that provides the user with interaction configuration support according to the three dimensions outlined in the developed model. Hopefully, this will give more insights into how social agents should be designed, evaluated and made possible for configuration by the end user.

9. References

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