The Exploratory of Personal Assistants

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Abstract. This paper presents a perspective of using personal assistants in personalized systems, particularly in both understanding the user model and generating appropriate adaptation and response. The paper discusses the use of a personal assistant as a data input source and the expected stereotypes based on mind-sets. This is the framework of exploring a user-centered design approach to building up the intelligent personalized system.

1 Introduction

"Users using the web are only one click away from a competitor." This is the common phrase used to encourage customer relationship management on the Internet. In electronic commerce, the development of relationships with remote users is vital to maintaining customer loyalty. Computers are now acting as an agent to attract and retain users. Therefore, information technologies have transformed into relationship technology. Thanks to the advances in technology, dynamic pages can be created on the fly. Web sites have taken the steps by delivering tailored products and services on the web in order to establish, maintain and extend a customer base. They will create stable long-term relationships with repeat customers in the long run. A lot of personalization systems are being proposed by researchers and companies to cater web pages to the needs of the current users (Brusilovsky, 2001). However, some data collection is not appropriate to be used to model the user profile precisely (Kobsa, Koenemann and Pohl, 2001). Besides that, quite a number of reported researches are not supported by empirical experimentation (Chin, 2001). So, one might not able to justify whether the proposed personalized system is usable and efficient. Therefore, this paper will look into how a personalized system uses a personal assistant as a data input in the next section.

2 Personal Assistant

The acquisition task is the first step in identifying the data input for personalized systems (Kobsa, Koenemann and Pohl, 2001). There are three types of data input for

personalized systems, namely data about users' characteristics, data about users' computer usage and data about users' hardware, software and physical environment. However, the paradox of an active user and the task orientation of users should be taken into account as the users visit a site. The user should not be exposed to a lengthy registration procedures or initial interviews (e.g. in a short survey format). Therefore, some researchers suggested quizzes as entertainment and offering incentives such as free merchandise. The other possible alternative is using a dialog system integrated with current personalized systems. The area of user modeling for dialogues has recently seen a welcome and increasing use of empirical methods (Zukerman and Litman, 2001). We proposed using a personal assistant to extend the dialogue system on an electronic shopping web site.

Why are personal assistants important in the user modeling? There are two important reasons. The first reason is that the "human figure" communicating with users captures their attention and makes them alert to messages delivered to them (Reategui and Campbell, 2001). A flower shop reported an increase in sales of up to three -times after a personal assistant, who helps the user to buy flowers and bouquets, was implemented on the Internet. Perhaps personalized information is more acceptable and salient if a personal assistant instead of a system-like interface presents it. A combination of a personal assistant and an information intensive site can build customer trust and acceptance (Urban, Sultan and Qualls, 1999). Besides that, several experiments using the "wizard of oz" method have proven that users benefit from the personal assistant during their online shopping session. However, most of them were using a pre-recorded session of interaction (McBreen, Shade, Jack and Wyard, 2000), using pre-defined questions to ask the personal assistant (Urban, Sultan and Qualls, 1999) and a real human as the assistant on the web (Aberg and Shahmehri, 2001). The users were having limited options of exploring the personal assistant's capabilities.

The second reason is because the personal assistant would allow users to develop a social relationship and allow a new way of data acquisitions for the user model. De Angeli, Johnson and Coventry (2001) have found that users would treat the personal assistant as a new relationship. Their research has shown some understanding of social rules driving the interaction between a user and a chatterbot. One of the most important processes in the formation and maintenance of a relationship is that of self-disclosure (the act of revealing private and personal information to others). It is a clear sign of trust and commitment to the relationship. In human-relationship and in Internet Chat Rooms, self-disclosure is intended to be a mutual process (refer to Example 1). Both parties are required to exchange intimate and personal details as well as feelings with each other.

Example 1. A typical self-disclosure in Internet chat room.
A: Hello
B: Hi there!
A: a/s/l please.
B: 25 f Malaysia. how about u?
A: me 26 m Singapore.
B: What are u looking 4?
A: looking 4 new friendship.
…

However, most chatterbots only simulate conversation without utilizing any knowledge about the users and their actual behavior during the online session. Secondly, they are not able to serve as a medium for customer advice if they are not able to interpret the individual dialog situation and allow goal-directed strategies to be pursued. Therefore, some exploration needed to be carried out to determine the real-time of user chatting with a personal assistant while searching the online shopping website. Besides that, we need to know how far the self-disclosure can be used as data input for a personalized system.

In order to explore the effect of a personal assistant, we are using the fixed stereotypes as the first step for representation references rather than having none. Ralph's (2000) preliminary study has shown that chatterbots with a sophisticated repertoire of conversational skills will fail to be more than entertaining, if the personal assistant does not treat a user as an individual having specific needs, preferences, etc. Therefore, an understanding of different user types will be beneficial to help developing an acceptable and believable personal assistant. Moe (2001) has identified four types of visitors on the Internet. They are

1. Directed-purchase visits. This user is ready to purchase right away.
2. Search and deliberation visits. This user is researching the information and eventually intends to buy.
3. Hedonic-browsing visits. This user is doing electronic window-shopping, that is shopping for pleasure or recreation.
4. Knowledge-building visits. This user is engaged in exploration to know more about the marketplace – a pursuit that may affect long-term shopping.

In the old-times, experienced sales people learned to distinguish between shoppers based on their in-store behavior. Sales people are more helpful when shoppers appear to be very focused in looking for a specific product. However, they are more likely to ignore shoppers who are merely just "window-shopping". In an electronic world, some reports argued that the behavior of users would be changed since most electronic marketplaces provide a more convenient way for goal-directed users to search for a product (Wind and Mahajan, 2001; De Kare-Silver, 2000). Now, the question is "Would the personal assistant be more helpful for users who are goal-directed, and be more sociable for users with exploratory behavior or vice-versa?" A user-centered design can be used to refine basic assumptions and the whole personalized system can be easily redesigned if needed (Petrelli, Angeli and Convertino, 1999). The reason is that their study pointed out some unpredicted situations and confirmed some working hypotheses.

3 Mind-Set

The concept of mind-set was originally suggested by Wurtzberg motivational psychologists (Kulpe, 1904, cited in Gollwitzer, 1996). A mind-set refers to a "specific cognitive orientation", imbued with distinct and unique features and can be of different types. Each mind-set is associated with different thought contents and different modes of information processing (Heckhausen & Gollwitzer, 1987). A mind-set can divided in two types: goal-directed mind-sets and experiential mind-sets.

Goal-oriented mind-sets consist of both deliberative and implemental mind-sets. A deliberative mind-set refers to a cognitive orientation where the consumer is intent on collecting and processing information, and is common in the problem-identification, information search, and decision-making stages of consumer behavior. On the other hand, an implemental mind-set refers to an action-focused, cognitive orientation that occurs after the decision has been made, and serves to facilitate smooth action execution for goal attainment.

An exploratory mind-set refers to a consumer's cognitive orientation to encounter new experiences and to satisfy his or her curiosity. On the other hand, experiential mind-set is the hedonic mind-set where the individual de-emphasizes cognitions, and focuses instead on the sensory elements of experience.

Security and privacy infrastructures should be used that both protect user data against possible attacks and allow users to remain highly anonymous with respect to the personalized system while still enjoying personalization. One of the suggested approaches is to provide comprehensive and intelligible advance notice to users about all the data that is to be collected, processed and transferred. As a result, this will increase users' trust in the application and is mandated by virtually all privacy laws. Furthermore, users can personalize ("opt-in") the processing of their data in voluntary consent.

4 Ongoing Work

This paper presents a perspective of using a personal assistant in personalized systems, particularly in both understanding the user model and generating appropriate adaptation and response. The research question is

1. What types of data input can be collected from first-time visitors, returning visitors, infrequent and frequent user needs when using a personal assistant?
2. What types of adaptation are needed for personal assistants when encountering first-time visitors, returning visitors, infrequent and frequent user needs?

At present, Moe (2001) proposed a typology of shopping strategies based on the user's click-stream in a website. Her result showed that each user can be classified into the four mind-set categories based on a series of click-streams. Our research is to investigate the user interaction, based on mind-set, with the personal assistant when visiting/shopping on a website. The first step is to identify the data input that can be used as a proper indication of the type of users. We are planning to build a prototype to simulate the personal assistant on a shopping website. Then we will perform online focus group sessions to collect the experiment data. The second step is to identify types of adaptation that are needed to support all these users. In this stage, we will prepare adaptation materials that are suitable for each type of users. Then we will perform a quantitative study online to collect the experiment data.

Therefore, our research is focused to comprehend users' acceptance of and reactions to the introduction of human characteristics in user interfaces. Defining the users' characteristics that may affect their acceptance of personal assistants and helping predict their behavior during the interaction is a major challenge. Before such adaptation can be designed and models can be developed, researchers must first

understand the underlying interaction patterns of the users, and how to identify different types of behavior. This paper is a first step in that direction.

To conclude, creativity can support the different styles of presenting information to users. For example, a portal can create a simple style if the users are goal-directed searchers. They can create a more elaborate and artistic style if the users are experiential surfers. Therefore, a personalized system with personal assistant has to be intelligent enough to support all these users.

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