ENHANCING USERS' TRUST IN SECOND-GENERATION ADVICE-GIVING SYSTEMS

Extended abstract

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Abstract

Advice-giving systems (AGSs), sometimes also called recommendation agents or recommender systems, are decision aids software that provide users personalized recommendations based on users' unique preferences or needs (Xiao and Benbasat, 2007; 2014). Due to their effectiveness in reducing users' information overload (Komiak and Benbasat, 2007) and facilitating users' decision-making process (Wang and Benbasat, 2008), AGSs have been considered as key influential factors of the success of online shopping websites in facilitating product customization and increasing revenue in e-commerce (Komiak and Benbasat 2006).

First-generation AGSs generate advice by asking users to explicitly indicate their product attribute preferences or needs. Such systems are usually labelled as content-filtering recommendation agents (Wang and Benbasat, 2005) and provide users with recommendations that best meet their preferences. Users who rely on such advice-giving systems to make decisions need to have a clear idea about their needs, to spend effort in identifying them, and then expressing or conveying them to the AGS. In recent years, another kind of AGSs, what we will label as second-generation AGSs, have become increasingly popular. Examples of second-generation AGSs include recommendations that appear in the homepages of websites such as Amazon, eBay, and Netflix, and content/ad push in websites like Facebook and Twitter. Unlike first-generation AGSs which directly ask users to provide their inputs of needs, second-generation AGSs implicitly collect and identify users' information, such as users' demographic information, past browsing behaviors, purchase behaviors, relationships with other users (Briggs and Smyth, 2006; Zhou et al., 2012), etc., and use these information as the input for their advice-generating process. In addition, compared to first-generation AGSs, second-generation AGSs employ more complex techniques to analyze data from a diverse set of input sources and generate advice for their users accordingly. Item-based collaborative filtering, an algorithm that generates advice similar to what users have adopted/bought before, and user-based collaborative filtering, an algorithm that offer users advice liked by other users who are similar to them, are basic techniques that support second-generation AGSs (Konstan and Riedl, 2012; Zhou et al., 2012). Based on these techniques, more advanced AGS models have already been suggested (Briggs and Smyth, 2006; O'Donovan and Smyth, 2005; Walter et al., 2008). For example, some researchers proposed a new kind of users-based collaborative filtering models that take into consideration the trust relationship among users (Zhou et al., 2012) to provide users with advice that are liked by other users whom they trust more.

Due to the effective decision aids AGSs bring to website users, it is important for website managers to know how to maximize user adoption of their AGSs in order to attract more users and increase website profits. Trust, as a crucial influential factor in IT adoption, has been shown to have an influence on users' adoption of AGSs (Al-Natour et al., 2008; Komiak and Benbasat, 2006; Wang and Benbasat, 2005; 2008) and product purchase intentions (McKnight et al., 2002; Wang and Benbasat, 2007). Us-

ers' trusts in AGSs can be influenced by a number of antecedents (for a summary, see Söllner, Benbasat, Gefen et al., 2016; Söllner and Leimeister, 2013). According to the framework developed by Wang and Benbasat (2008), we summarized the trust antecedents of AGSs, for both first- and second-generation ones that have already been studied in the existing literature, into six categories, namely dispositional reasons, institutional reasons, heuristic reasons, calculative reasons, interactive reasons, and knowledge-based reasons. Dispositional reasons include users' general predispositions to trust other parties. Institutional reasons include societal structures (e.g., legislation, rules, and third-party assurances) that people believe will make an environment trustworthy. Heuristic reasons include users' impressions of the website/e-vendor and users' past experiences with the system. Calculative reasons include users' perceived intelligence/efficiency/personalization of systems, users' privacy concerns, and users' perceived possibility/solutions of systems' mistakes/opportunistic behaviors. Interactive reasons include users' perceived control over systems, users' social presence, users' perceived ease of use, users' perceived similarity with systems, users' perceived adaptiveness of systems, users' decision confidence, etc. Knowledge-based reasons include explanations of how advice is generated/why AGSs ask certain questions.

Over the past decade, users' trusts in first-generation AGSs have been thoroughly studied (Al-Natour, et al., 2006; 2008; Komiak and Benbasat, 2006; Wang and Benbasat, 2005; 2007; etc.). However, our understanding of users' trusts in second-generation AGSs is in its infancy. Most of the existing research about second-generation AGSs are conducted from a technical perspective, focusing on how to design better algorithms in order to generate higher quality advice. Very few studies, the topics of which are related to users' perceptions on such systems, only roughly mention the potential trust risks due to the unique features of such systems and stay at the theoretical level. Hardly any empirical studies can be found in the literature. We argue for the necessity of studying users' trusts in second-generation AGSs because users may feel second-generation AGSs are less controllable and less transparent than first-generation ones due to the implicit elicitation of user needs and high complexity of advice-generating algorithms in second-generation AGSs. Accordingly, influential factors of users' trusts in second-generation AGSs may also be different from those in first-generation ones.

Based on the literature, we picked out trust antecedents that were once studied in the context of second-generation AGSs. We found that researchers who studied trust antecedents of second-generation AGSs mainly focused on calculative reasons, interactive reasons, and know-based reasons. The trust antecedents they studied are either unique to second-generation AGSs or more important in the context of second-generation AGSs than that of first-generation AGSs. Accordingly, we proposed design suggestions for trustworthy second-generation AGSs. In order to increase users' trusts through affecting calculative reasons, we suggest that second-generation AGSs should be designed with intelligence high enough to keep bringing users "pleasant surprise" – recommendations that they have never thought of but will fall in love with at the first glimpse. We also suggest second-generation AGS designers to provide clear instructions about: a) what kind of user information they collect; b) when, how, and why they collect such information from users; and c) how they will use the collected information; and d) structural assurance that can ensure the privacy and security of users' input data. In order to increase users' trusts through affecting calculative reasons, we suggest designers create sufficient opportunities for users to provide feedbacks for previously generated advice to AGSs (e.g. whether users like the advice, why do users like/dislike the advice, etc.). In addition, we suggest designers create interfaces for human intervention when developing second-generation AGSs. In order to increase users' trusts through affecting knowledge-based reasons, we suggest designers indicate the input used for advice-generating process, use plain words to explain the complex advice-generating techniques, and avoid giving non-specific explanations such as "Here are recommendations for you".

Our research makes contributions in both academic and practical field. Unlike existing research focusing on the design AGS algorithms, we studied trust, a crucial factor of successful adoptions of such AGS technologies. To the best of our knowledge, our research is one of the first to systematically study trust issues on second-generation AGSs in the IS field. As for practical contributions, this paper helps system designers better develop second-generation AGSs by proposing detailed design suggestions.

Keywords: Trust, Trust antecedent, Second-generation advice-giving system, First-generation advice-giving system, Design suggestion.

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