Enhancing service interactions with conversational agents

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In the past decade, the deployment of conversational agents (chatbots, avatars, robots) has become increasingly prevalent. As discussed in depth in chapter 1, improved capabilities to respond to users, driven by advances in artificial intelligence and, in particular, natural language processing, have enabled their use in various service contexts. Their unique ability to mimic human communicative behaviors (HCBs) can provide benefits for users and service providers, yet knowledge on how to use this ability effectively is still lacking. Although anthropomorphism theory and the CASA paradigm have provided a basic understanding of how relational variables such as trust and liking can be affected by conversational agents' use of human-like communicative behaviors, the reality is more complex. Therefore, this dissertation aimed to investigate the effects of the use of HCBs by conversational agents on relational outcomes and how these HCBs can be implemented into service encounters considering users' individual needs and the service context.

The results of this dissertation support the notion that a one-size-fits-all approach for the implementation of HCBs in conversational agents does not exist. Both the literature review (chapter 2) and the generative design study (chapter 3) show that users largely agree on how conversational agents should look. Users need to be able to identify with a conversational agent and find it important that a conversational agent has a warm appearance that conforms to certain social norms. However, users' needs concerning conversational agents' verbal and nonverbal behaviors are more idiosyncratic. In particular, users express different preferences for the frequency, timing, and applicability of social-oriented verbal (e.g., empathy, small talk) and nonverbal behaviors (e.g., nodding, emotional expressions). These needs seem to vary as a function of the service context, the phase of the service interaction, and individual users' needs, such as experiencing discomfort. The experiment in chapter 4 showed that it is best to implement such behaviors in a way that they are adaptive to the user in every turn of the interaction. Finally, the experiment in chapter 5 validated that social-oriented nonverbal behaviors are particularly important when the user experiences discomfort.

For researchers, these findings highlight the impact of users' needs and factors that drive these needs (e.g., the service context and the different stages of the service interaction). As such, this dissertation has provided input for a broader

theoretical framework that might explain the mixed effects in the current literature on conversational agents. We want to encourage researchers to investigate technologies that allow conversational agents to recognize users' needs in real-time and adapt their communicative behavior to the dynamics of the service interaction and individual user characteristics. Furthermore, we hope that particularly the generative design study (chapter 3) will inspire other researchers to investigate users' latent needs for human-like communicative behaviors in conversational agents in a broader set of service contexts and with more variation in users.

For service designers and managers, this dissertation offers a blueprint for improving service interactions involving conversational agents. In particular, we describe users' latent needs for both appearance and verbal and nonverbal behaviors of conversational agents. More importantly, we recommend practitioners to carefully investigate the individual needs of their users, the structure of their service interactions, and other context-related factors that could impact users' needs. Yet, this dissertation does not only provide a blueprint for service designers and managers but is also applicable in other contexts. Due to the rapid technological developments and the COVID-19 pandemic, the use of conversational agents has found new applications. For example, avatars or virtual agents are increasingly used as 'virtual influencers', marketing products and services to millions of followers. In addition, conversational agents are becoming more prevalent in domains such as mental health, coaching, and motivating patients, where the ability to build relationships with users is perhaps even more important than in many 'standard' service contexts. Incorporating the findings of this dissertation into the design of these conversational agents can therefore be expected to bring considerable societal benefits.

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To conclude, by highlighting the importance of users' communicative needs and factors influencing these needs, we hope to contribute to the development of sustainable services in many different domains. Conversational agents can provide benefits for both users and service providers, yet, only if they are designed explicitly for and by users. We are confident that the rapid technological developments will further enhance conversational agents' capabilities and home to motivate others to investigate how the quality of human-machine interactions can be enhanced further.