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Towards leveraging users' mental models of Voice Assistants (VAs) through increased transparency

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Abstract

Artificial Intelligence (AI)-based Voice Assistants (VAs), such as Siri and Alexa, are increasingly popular and can act as touchpoints for various services, including consumer support and voice-based online shopping. When employed in consumer services, these interfaces also have the potential to improve the accessibility of by offering a hands-and-eyes-free interaction, facilitating everyday tasks such as shopping (e.g., Alexa), music streaming, and urban mobility. However, users' mental models of these systems are unaligned with their actual functioning and capabilities (Luger & Sellen, 2016). Considering that design aspects are vital for users' models (Norman, 2013), increasing transparency in VAs outputs (e.g., feedback, instructions) may support users in forming more adequate models. For example, studies show that increased transparency leads to better task performance, usability, comprehension of error sources, and error recovery (Kirschthaler et al., 2018; Kim et al., 2019).

Nonetheless, most research on eXplainable AI (XAI) - approaches that aim to increase transparency in AI systems - focuses on technical aspects of explainability rather than human-centered recommendations (Schmidt, 2020). Such a gap might be problematic since, despite its benefits, increased transparency might harm usability and user experience if incorrectly applied. Therefore, this research aims to create and evaluate recommendations for applying transparency to VAs, supporting users' mental models while ensuring human-centered requirements. Specifically, our investigation intends to account for relevant contextual characteristics. For example, users' aspects, such as expertise with technology or VAs (Chen et al., 2018) or their cultural background (Pridmore et al., 2019), have been shown to affect users' perceptions of VAs. Furthermore, studies indicate that users perceive different tasks to have varying complexity levels (Motta & Quaresma, 2021; Luger & Sellen, 2016).

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Hence, considering VAs' broad domain applicability, assessing how contextual characteristics can moderate the relationship between transparency and users' mental models is paramount. Consequently, exploring different contexts is essential to produce knowledge on applicable recommendations, and investigations in varied service fields (e.g., shopping, mobility, etc) may be conducted. Such an exploration may indicate how transparency levels should be adequately applied to different contexts to leverage users' overall experience with VAs.

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