Abstract

Early User Centered Insights on Voice Integrated Technologies Through Retrospective Analysis

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Abstract

Background: There is increasing interest in incorporating voice-activated technology (VAT), such as Amazon Alexa, Google Home, and Microsoft Cortana, into the existing connected health, mHealth, and mobile medical app ecosystems. VATs allow for natural-language interactions and offer patients the promise of increased usability, greater engagement, and improved adherence to treatments and/or medications. Despite this interest, there is little ethnographic data on patients' use of VAT or unmet needs. This data is critical to developing VAT applications that interact with medical devices, where regulatory or design control considerations require a higher level of rigor compared to unregulated consumer applications. As first-mover, Amazon Alexa technology has dominated the VAT market; customer reviews of Alexa-enabled devices outnumber the next closest technology 19 to 1. We hypothesized that Amazon Alexa was a good proxy for VAT users at large, and that systematic coding and analysis of 95,000 reviews for Amazon Alexa devices could provide insights that would accelerate follow-on research efforts to support development of user-centered VAT applications for connected health.

Objective: Primarily, we sought to explore whether Amazon reviews could be used to develop initial research hypotheses, pain points, and user insights, in much the same way complaint reviews inform early development of medical devices and interventions. Secondarily, we explored whether VAT reviews could be used to identify unmet needs around VAT-for-healthcare applications.

Methods: We conducted an exploratory, manual retrospective analysis of 28,271 full-text user reviews for Amazon's Echo and Dot devices, including all reviews from February to July 2017. This represented approximately 31% of all available Amazon Alexa review data. Two authors (CT/AC) screened each review for relevance, defined as any mention of an issue related to use, misuse, unintended/unexpected event, or novel application of technology. Relevant reviews were manually coded by the authors into one or more of nine categories.

Results: There were 284/28,271 user reviews (~1%) that were relevant, yielding valuable user-related insights in our areas of interest. Most relevant reviews focused on Healthcare-Related Workarounds (141), Quality of Life Improvement (159), and Physical Disability (93). We also found relevant, useful information related to Neurological Disorder/Disability (39), Unauthorized Interactions (23), Unexpected Use Settings (33), Natural Language Barriers/Advantages (50), Companionship (50), and Noteworthy Benefits to Healthcare (16). We found the reviews to contain significant detail, allowing us to generate initial insights without the expenditure and complexity of traditional user research.

Conclusions: The results of our manual review and coding provided unexpectedly rich information regarding unique device uses, curious workarounds, and unexpected complications. This analysis offers an early effort to improve understanding of how this type of technology may be used in the medical field. Given the currently sparse literature in this space, our study provides a roadmap for future studies centered around VATs in digital health. All remaining reviews should be similarly analyzed and catalogued for future use. Such investigations could involve more detailed exploration of patient practices using other user research methods in order to inform future development in this area.

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KEYWORDS

interactive voice response; Voice Recognition; connected health; human factors; use environment; use errors

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