Inclusive Design of CUIs Across the Intersection of Race and Disability

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Abstract
Racially minoritized people with disabilities experience amplified levels of inequity due to their marginalized identities, especially witnessed in health disparities. This exclusion of care and access is imitated in conversational interfaces. We consider how to approach more inclusive CUI's through an intersectional lens of race and disability, to further create more empathetic and equitable interactions for health technology design in HCI research.

Author Keywords
disability, accessibility, voice interfaces, inclusive design, race, intersectionality

CCS Concepts
•Social and professional topics → **Race and ethnicity; People with disabilities; •Human-centered computing** → *Accessibility design and evaluation methods; Interaction design process and methods;*

Introduction
The prevalence of conversational user interfaces (CUIs), like AI chatbots, voice assistants, smart speakers, and the most recent landmark development with chatGPT-3 has created a plethora of new paradigms for CUI's, their capabilities, and contexts of use. CUI's are becoming a definitive part of mainstream technology – establishing themselves as

an essential interaction modality and a dependable pathway for accomplishing tasks [24]. This pervasive momentum of CUI's has increased widespread use across domains, industries, products and services. People can encounter a CUI while searching for directions, ordering food, asking for tech support, reporting medical issues, or even calling a crisis hotline [7]. The dynamic nature of CUI's, whether text-, speech-, or voice-based, makes it a malleable medium for large scale use [14, 4]. Regardless of its ubiquity however, these systems still foster a racial and ableist divide [21, 37, 23]. For example – CUI's have been known to misunderstand AAVE dialects, deaf accents, and other speech patterns [30]. These systems don't have perceptions of the variability in ability or disability, and tend to reinforce stereotypes and make negative associations of people with disabilities [19]. The representation of ability is skewed towards visible disabilities and excludes any acknowledgement of invisible disabilities. Additionally, current design of CUI's are based on language that is biased and harmful towards racially minoritized people with disabilities, thus there needs to be more mechanisms of empathy designed into CUI's to better accommodate these marginalized identities [29].

Researchers have called for examinations of how CUI's can be more empathetic [33], with empathy being designated as a core tenet of inclusive design [11], and one of the fundamental characteristics of human conversation [36]. Ways of connecting across cultural contexts, through sensitive dialogues and emotionally charged conversations, like healthcare, involve empathetic exchanges [8], especially for racially minoritized individuals who are living with disabilities. Given that much of emerging technology excludes these groups, there is an opportunity and fundamental necessity for CUI's to be more equitably designed for racially minoritized people with disabilities.

Experiences of Bias Among Marginalized Identities

Race is a dimension of identity that has been found to impact people's relationship with, access to, and adoption of technology [16]. Oftentimes, mainstream approaches to the design of systems such as voice technology excludes marginalized identities, leading to biased consequences and outcomes [6]. They generally have to carry the burden of computing systems that are built without their needs in mind. This often mirrors the recursive patterns of discrimination many marginalized groups experience based on their social identity. For example, frequently facing incidents of medical racism, stigma, stereotyping, and microaggressions from clinical professionals has manufactured grave mistrust and feelings of neglect from the healthcare system [12, 2]. This apprehension and unfair treatment has translated into skepticism of healthcare technology and its capacity to be a more empathetic medium of care [26].

Experiences such as those in healthcare are exacerbated for racially minoritized people with disabilities who experience higher levels of stigma, discrimination, and ostracization [15]. According to the CDC's 'Disability and Health Promotion Report by Ethnicity and Race', Black adults experience the greatest number of disabilities, influencing a heightened level of health risks [9]. The compounded effects of racial ethnic group and disability is a key indicator of disparities in socioeconomic status and health along with barriers to education and employment, which increases with age [20, 25].

Racially minoritized groups living with disabilities experience similar frictions of use in their encounter with technology. Technology for accessibility is often conceptualized from a deficit-driven perspective, reduced to the medical and curative lens, contributing to the erasure of disability

identity [38], especially when it comes to health technology [27]. AI systems and language models classify people with disabilities as inferior, often associating "disability" as "bad" [37]. Technology design must recognize the multidimensional nature of disability, particularly how identity defines one's relationship with health and materializes in lived experiences [1]. Exploring this confluence of race and disability through an intersectional lens and critically engaging communities of racially minoritized people with disabilities can address those challenges and create opportunities for health technology inclusion.

Intersectional Inclusion in Technology, Design, and HCI

The topic of building more inclusive experiences for people with disabilities has notably emerged in research related to CUIs in HCI, evaluating what requirements, components, and design elements are necessary for successful conversational agents across these groups [22]. Prior work has addressed more accessible CUI's for health information seeking [18], social connectedness [10], task-based guidance and wayfinding [31], and language learning across disabilities [13]. Among this, there is a predominant exploration of how conversational and speech modalities can specifically help people with vision impairments [35]. Much of this work has also focused on CUI's supporting older adults [5].

In recent years, many research scholars have called for a more critical lens of engaging with race and racial dimensions of technology design within HCI [17, 28, 32]. While HCI has maintained a strong research agenda in disability, engagement at the intersection of both race *and* disability in technology design are still faint. Bennett et. al. provides a landmark example in the discussion of race, gender, and disability around image descriptions [3], suggesting a need to critically assess tensions across these generally siloed categories. "Dreaming Disability Justice in HCI" [34] also calls for HCI and assistive technology to consider complex constructions of race and disability for future design research. Thus, analyzing how these facets of marginalized identities navigate healthcare experiences and interact with health disparities can help determine a more equitable and empathetic roadmap for inclusive CUI design.

Direction for Inclusive CUI's

Technology design still grapples with how to build more inclusive experience across cultural contexts and communities. The continued exclusion of racially minoritized people living with disabilities is vested within this disparity of diversity. As biases and microaggressions commonly reported across healthcare interactions are being reverberated in the development of CUI's, it's critical to identify these mechanisms of marginalization and how they manifest in technology interactions for this group. The affordances of CUI's have the potential to provide opportunities for more empathetic interactions, but we must first understand how empathy is experienced, acknowledged, exchanged, and idealized for members of this community. Upon conceptualizing these intersections and how they play a role in health contexts, we can decipher the limitations current systems exhibit and make them more inclusive. We hope to establish a more inclusive design methodology to envision systems that are capable of exhibiting empathy necessary for providing more equitable interactions for racially minoritized people with disabilities. Understanding what values, behaviors, and signifiers surrounding conversations of healthcare evoke elements of empathy can help define proper design parameters for future CUI design, and its directions for more positive interactions. Our overarching research goal is to address the area of designing more inclusive CUI's by attending to the intersection of race and disability.

RESEARCH QUESTIONS TO CONSIDER:

1. How can we reduce bias and microaggressions in CUI's for racially minoritized people with disabilities?
2. How can we deconstruct what empathy means to marginalized intersectional identities to better contextualize design for inclusive CUI's?
3. In what contexts do these dimensions intersect with health experiences?

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