Some Studies on Accessible Mobile Interfaces for Visually Challenged

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ABSTRACT

Globally, over 43 million people are visually challenged (VC), and an estimated 295 million live with moderate to severe visual impairment, according to the World Health Organization. In India alone, there are more than 9 million VC individuals—the highest for any country. Despite growing smartphone penetration and advancements in assistive technologies like screen readers, visually challenged users continue to face significant usability challenges. Mobile apps are still largely designed for sighted users, often overlooking non-visual interaction needs. This research addresses that critical gap, aiming to promote digital equity through more inclusive, experience-driven design.

Despite advancements in digital accessibility standards, many mobile applications still struggle to provide equitable user experiences for visually challenged (VC) individuals. While compliance with accessibility guidelines such as WCAG 2.1 has improved, these standards often overlook the deeper usability challenges faced by non-visual users who rely on screen readers. This thesis addresses these gaps through a comprehensive series of studies involving over 100 participants. The research highlights significant disparities in usability between VC and sighted users, revealing that while apps may meet basic accessibility criteria, their interaction models often prioritize visual aesthetics and efficiency over accessibility for VC users. Ethnographic research and NASA TLX assessments provide deeper insights into the cognitive demands and usability challenges experienced by VC users, particularly in tasks like form filling and error management.

Based on these findings, the SEE (Sensory-Equitable Experience) Framework is developed—a co-design approach aimed at improving VC user comfort, confidence, and usability perception. Prototype testing validates the framework's effectiveness in enhancing the overall user experience for VC individuals. This thesis proposes a shift in perspective from mere technical compliance to a more inclusive and user-centered design approach. It advocates for mobile UX practices that consider diverse user needs and experiences, aiming to set new standards in digital accessibility and usability.