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Research on Visual Design of Smart Phone APP Interface Based on Human-Computer Interaction Behavior

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ABSTRACT

This paper explores the application and influence of human-computer interaction behaviours in the visual design of smartphone APP interfaces. This paper firstly analyses the user's behavioural characteristics, interaction mode and optimization of the interaction process, and points out that the interface design should be closely integrated with the user's needs. Then the article puts forward the principles of smartphone app interface visual design, which provides a guiding framework for designers. In elaborating the design elements, the importance of colour, icon and text in interface design is emphasized, and the corresponding design principles and methods are proposed. The article concludes with a summary of the research results pointing out the problems and shortcomings, and looking forward to the future development trends and directions. This article aims to improve the user experience rate and interaction efficiency of smartphone APP interface design, and provide useful references for research and practice in related fields.

KEYWORDS

Man-Machine Interaction, Smartphone App, Interface Visual Design, User Experience, Design Philosophy, Design Elements, Electronic Technical Service

In addition to the surge in smartphone applications, the mobile app market is witnessing a rapid evolution in user preferences and behaviors. Users are increasingly discerning, seeking apps that not only fulfill functional needs but also resonate with their aesthetic sensibilities (Wu et al., 2024). Consequently, the demand for visually appealing and user-friendly interfaces has never been higher. With the rapid development of the mobile internet, a large number of regulatory measures for the application industry has been introduced, one after another, to safeguard users' network security while the market develops, and the number of smartphone applications (apps) is developing in a healthier direction (as shown in Figure 1), and as of the end of March 23rd, 2024, the number of active apps monitored in China's domestic market was 2.61 million. Moreover, the sheer abundance of available apps has intensified competition among developers. In this fiercely contested arena, where millions of apps vie for the attention of users, the user experience (UX) emerges as a pivotal differentiator (Durgekar et al., 2024). Apps that seamlessly blend functionality with intuitive design stand poised to capture and retain user interest in an increasingly crowded marketplace. However, in the face of a wide range of apps, users tend to prefer those with friendly interfaces and easy operation. At the heart of effective UX lies the concept of human-computer interaction (HCI), a multidisciplinary field that explores the interplay between users and digital systems. By understanding users' cognitive processes, behaviors, and preferences, HCI seeks to optimize the design of interactive systems to enhance usability and satisfaction. The visual design of the smartphone app interface is the specific embodiment of

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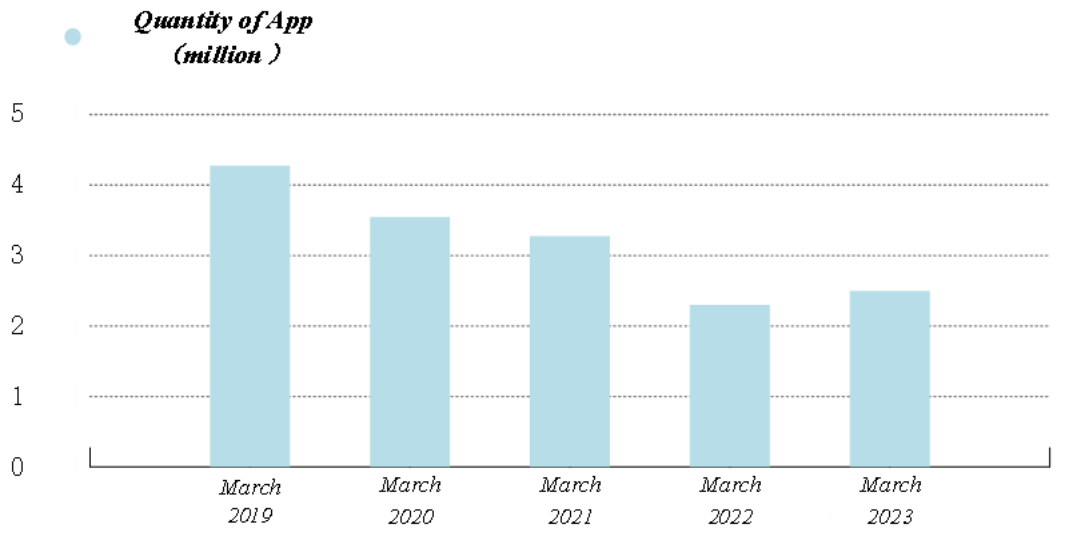
Figure 1. Number of smartphone apps



HCI in mobile device applications (Wan, 2021). Smartphone app interface visual design is not only about whether the interface is beautiful or not but also about whether it can effectively guide users to operate, whether it can accurately convey information, and whether it can provide a comfortable visual experience (Andrew et al., 2024). Good interface visual design can help users understand and use an app faster, thus increasing user satisfaction and loyalty.

In the context of smartphone app development, HCI principles are instrumental in shaping interface design strategies. Designers leverage insights from HCI research to create interfaces that not only meet users' functional needs but also align with their mental models and usage patterns. By prioritizing factors such as simplicity, consistency, and customizability, designers strive to craft interfaces that facilitate effortless interaction and engender a positive user experience.

Furthermore, the integration of emerging technologies such as artificial intelligence (AI) and augmented reality (AR) presents new opportunities and challenges for interface design. AI-powered algorithms can analyze user behavior in real-time, enabling personalized recommendations and adaptive interfaces. AR technologies, meanwhile, offer immersive and interactive experiences, transforming how users engage with digital content. In light of these developments, the study of smartphone app interface visual design based on HCI principles assumes heightened significance. By elucidating the intricate relationship between user behaviors and interface design, this research not only informs current design practices but also paves the way for future innovations. Through empirical analysis and iterative design processes, developers can refine their understanding of user needs and preferences, driving continuous improvement in app interfaces (Gong et al., 2020).

In summary, the convergence of HCI principles, emerging technologies, and evolving user expectations underscores the dynamic nature of smartphone app interface design. As developers navigate this ever-changing landscape, a steadfast commitment to understanding users' needs and delivering exceptional experiences remains paramount. By embracing HCI principles and leveraging technological advancements, developers can create app interfaces that not only meet functional requirements but also captivate and delight users in an increasingly competitive market. Structured into several key sections, this work begins by examining the current landscape of smartphone app usage and the role of HCI in shaping user experiences. It then delves into the principles of interface visual design, including simplicity, consistency, and customizability, elucidating their significance in creating engaging user interfaces. Subsequent sections explore specific elements of interface design,