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**Abstract** The rapid evolution of machine learning (ML) technologies has opened up unprecedented opportunities in the development of adaptive user interfaces that can dynamically respond to the behavior, needs and emotional state of the user. Using ML techniques such as natural language processing, image recognition and real-time data analysis, these interfaces achieve a high level of personalization and interactivity, overcoming the most problematic area for users in obtaining the desired content. This paper examines the current potential of machine learning in the development of adaptive interfaces, which has an important application in educational platforms and assistive technologies for people with disabilities. The study highlights how ML-driven adaptive interfaces can dynamically adjust content, navigation and interaction modalities according to the specific requirements of users. For the educational process, such interfaces can change teaching strategies based on real-time assessment of the student's progress and emotional engagement. Similarly, assistive technologies can provide more intuitive and accessible solutions for people with motor, visual, or hearing impairments by recognizing gestures, voice commands, or facial expressions. Particular attention is paid to very promising tools like Google Teachable Machine, which simplify the development of adaptive systems. The evidence suggests that ML-based adaptive interfaces can improve learning outcomes and accessibility, while addressing critical issues such as data privacy and ethical implementation. Integrating such interfaces into broader technology ecosystems has the potential to improve user satisfaction, increase productivity, and promote inclusivity. Despite these benefits, the study highlights the need for robust frameworks to mitigate ethical concerns, increase algorithmic transparency, and ensure equitable access to adaptive technologies.

**Keywords** Machine learning · Adaptive interfaces · User experience · Teachable machine