# Apple pioneers brain-computer interface to enable device control with thought



Apple's recent advancements in accessibility technology signal a profound commitment to enhancing the lives of individuals with severe motor impairments, particularly those affected by conditions like amyotrophic lateral sclerosis (ALS). The tech giant has announced plans to integrate Switch Control for brain-computer interfaces (BCIs), offering a revolutionary way for users to interact with devices including iPhones and the Vision Pro headset.

This new initiative, created in collaboration with Australian neurotech startup Synchron, allows individuals with implanted devices near the brain’s motor cortex to control their smartphones and other Apple devices using only their thoughts. The brain implant captures electrical signals produced when the user intends to move, translating this activity into digital commands. This technological leap could empower users who are otherwise unable to use standard inputs like touchscreens or keyboards.

Apple's existing Switch Control feature already enables users with motor impairments to navigate their devices through a variety of adaptive methods, including switches and sound-based inputs. Enhanced now by BCI technology, this feature aims not only to provide access but to restore some autonomy to users who might otherwise feel locked out of the digital world. Although still in early stages, the integration of BCI technology represents a significant step forward, allowing users to make selections and navigate devices with mere thoughts.

The implications of such a system vastly expand when paired with Apple's AI-driven Personal Voice feature. Initially designed to allow users—especially those at risk of losing their speech due to conditions like ALS—to create a synthetic version of their own voice, Personal Voice requires users to record a series of sentences for a personal voice model to be generated. This technology not only facilitates communication but also preserves a sense of individuality.

With BCI integration, users who have lost physical means of communication could potentially "think" their responses into existence, transforming their intangible thoughts into verbal expressions through digital means. This interactivity can lead to powerful outcomes, such as allowing someone with ALS to send messages or engage in conversations as if they were doing so through their own voice, despite significant physical limitations.

Moreover, recent demonstrations have shown the transformative potential of these advancements. A 64-year-old man with ALS was able to control an Apple Vision Pro headset merely by thinking about the actions, successfully playing Solitaire and sending text messages without any physical input. Such success narratives highlight how BCI technology can bridge the gap between users and the digital world they rely on for both personal and professional interaction.

While the pace of development may initially seem gradual, the focus on improving the user experience is paramount. Apple's ambition with these technologies is not limited to enhancing accessibility; it aims to enrich the digital experience by ensuring that all users can engage meaningfully with their devices, regardless of their physical capabilities. By enabling a new mode of interaction, Apple is not just improving user experience but also redefining what it means to communicate and connect in an increasingly digital age.

As Apple continues to roll out these innovations, it underscores the importance of involving the disability community in the development process, ensuring that diverse user needs are met and considered in creating effective solutions. The convergence of brain-computer interfaces with advanced AI voice technology marks an exciting frontier in assistive technology, one that promises to empower individuals with spinal cord injuries and other debilitating conditions, allowing them to reclaim their agency in the digital realm.

### Reference Map

1. Paragraphs 1-2: [[1]](https://www.techradar.com/computing/artificial-intelligence/apple-wants-to-connect-thoughts-to-iphone-control-and-theres-a-very-good-reason-for-it)
2. Paragraph 3: [[2]](https://www.apple.com/accessibility/mobility/)
3. Paragraph 4: [[3]](https://machinelearning.apple.com/research/personal-voice)
4. Paragraphs 5-6: [[5]](https://www.macrumors.com/2024/07/30/vision-pro-can-now-be-controlled-with-brain/), [[6]](https://www.fiercebiotech.com/medtech/synchron-links-brain-computer-interface-apple-vision-pro-headset)
5. Paragraph 7: [[7]](https://www.apple.com/ci/newsroom/2023/05/apple-previews-live-speech-personal-voice-and-more-new-accessibility-features/)

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## Bibliography

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2. <https://www.apple.com/accessibility/mobility/> - Apple's Switch Control feature enables users with motor impairments to control their devices using adaptive switches, game controllers, or even sounds. This accessibility tool allows for navigation through onscreen keyboards, menus, and the Dock, and supports creating custom panels and keyboards. Additionally, Platform Switching lets users control multiple Apple devices from a single device, and Apple Watch mirroring allows full control of the Apple Watch from an iPhone. The feature also supports gaming by turning switches into virtual game controllers. ([apple.com](https://www.apple.com/accessibility/mobility/?utm_source=openai))
3. <https://machinelearning.apple.com/research/personal-voice> - Apple's Personal Voice feature assists individuals at risk of losing their ability to speak, such as those with ALS, by allowing them to create a synthesized voice that resembles their own. Users record 150 sentences, and the device processes this data to generate a personalized voice model. This model enables users to communicate using their unique voice in FaceTime, phone calls, assistive communication apps, and in-person conversations. The process is entirely on-device, ensuring privacy and security. ([machinelearning.apple.com](https://machinelearning.apple.com/research/personal-voice?utm_source=openai))
4. <https://www.apple.com/ci/newsroom/2023/05/apple-previews-live-speech-personal-voice-and-more-new-accessibility-features/> - Apple introduced new accessibility features, including Live Speech and Personal Voice, designed to aid individuals with speech impairments. Live Speech allows users to type messages that are spoken aloud during calls and conversations, while Personal Voice enables users at risk of losing their speech to create a synthesized voice that sounds like them. These features were developed with input from the disability community to support diverse user needs and enhance connectivity. ([apple.com](https://www.apple.com/ci/newsroom/2023/05/apple-previews-live-speech-personal-voice-and-more-new-accessibility-features/?utm_source=openai))
5. <https://www.macrumors.com/2024/07/30/vision-pro-can-now-be-controlled-with-brain/> - Apple's Vision Pro headset can now be controlled using thoughts, thanks to integration with Synchron's brain-computer interface (BCI). A 64-year-old man with ALS demonstrated this by controlling the cursor on the Vision Pro to play Solitaire, watch Apple TV, and send text messages without using his hands. This advancement allows users with severe motor impairments to interact with the Vision Pro through thought control. ([macrumors.com](https://www.macrumors.com/2024/07/30/vision-pro-can-now-be-controlled-with-brain/?utm_source=openai))
6. <https://www.fiercebiotech.com/medtech/synchron-links-brain-computer-interface-apple-vision-pro-headset> - Synchron, a brain-computer interface developer, reported that one of its implanted patients was able to control an Apple Vision Pro headset using only thoughts. The patient, a 64-year-old man with ALS, used his thoughts to play Solitaire, watch videos, and send text messages, demonstrating the potential of BCI technology to assist individuals with severe motor impairments in interacting with advanced devices. ([fiercebiotech.com](https://www.fiercebiotech.com/medtech/synchron-links-brain-computer-interface-apple-vision-pro-headset?utm_source=openai))
7. <https://www.apple.com/ci/newsroom/2023/05/apple-previews-live-speech-personal-voice-and-more-new-accessibility-features/> - Apple introduced new accessibility features, including Live Speech and Personal Voice, designed to aid individuals with speech impairments. Live Speech allows users to type messages that are spoken aloud during calls and conversations, while Personal Voice enables users at risk of losing their speech to create a synthesized voice that sounds like them. These features were developed with input from the disability community to support diverse user needs and enhance connectivity. ([apple.com](https://www.apple.com/ci/newsroom/2023/05/apple-previews-live-speech-personal-voice-and-more-new-accessibility-features/?utm_source=openai))