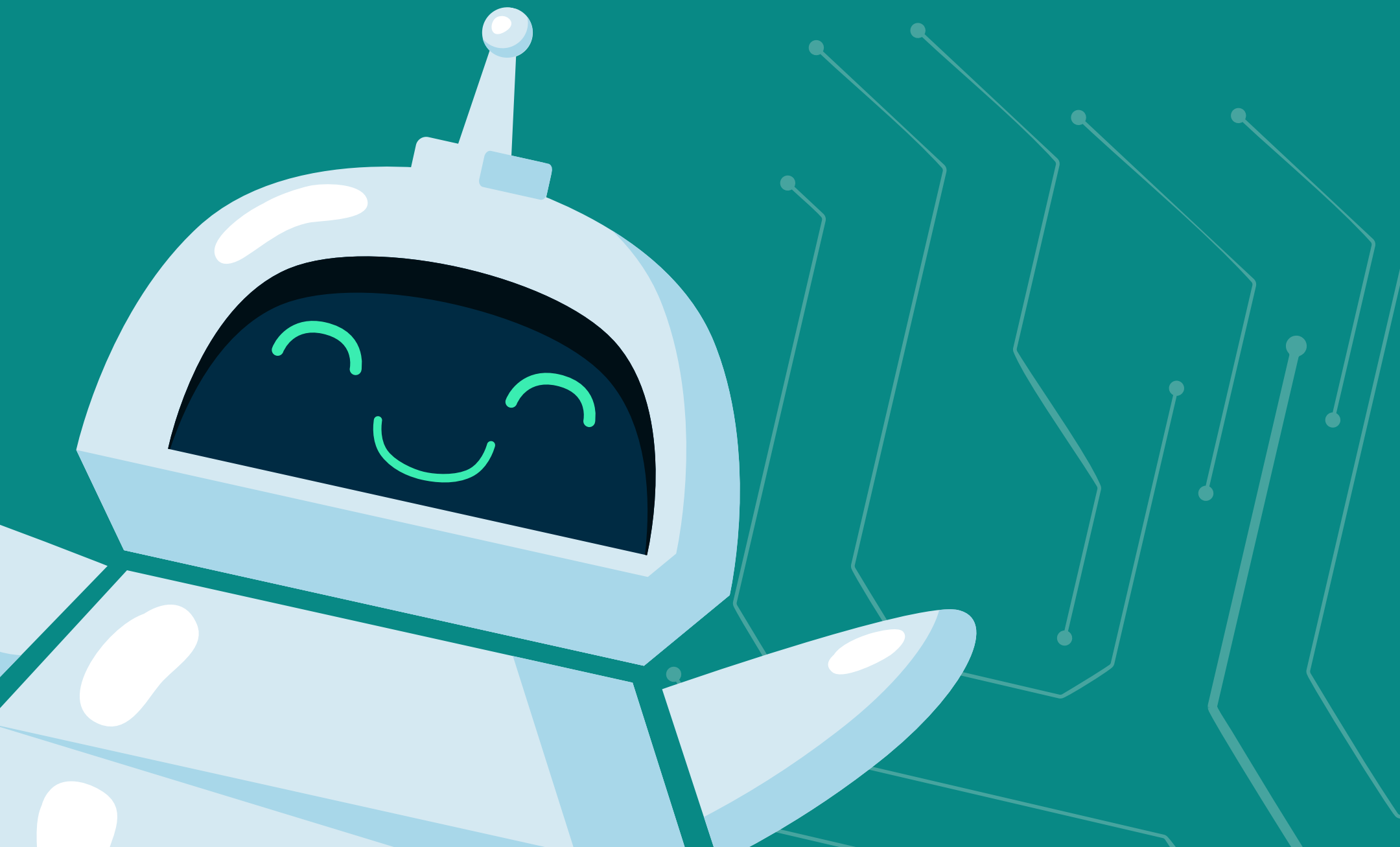


Brain - Computer Interfaces (BCIs)

Bringing Minds and Machines

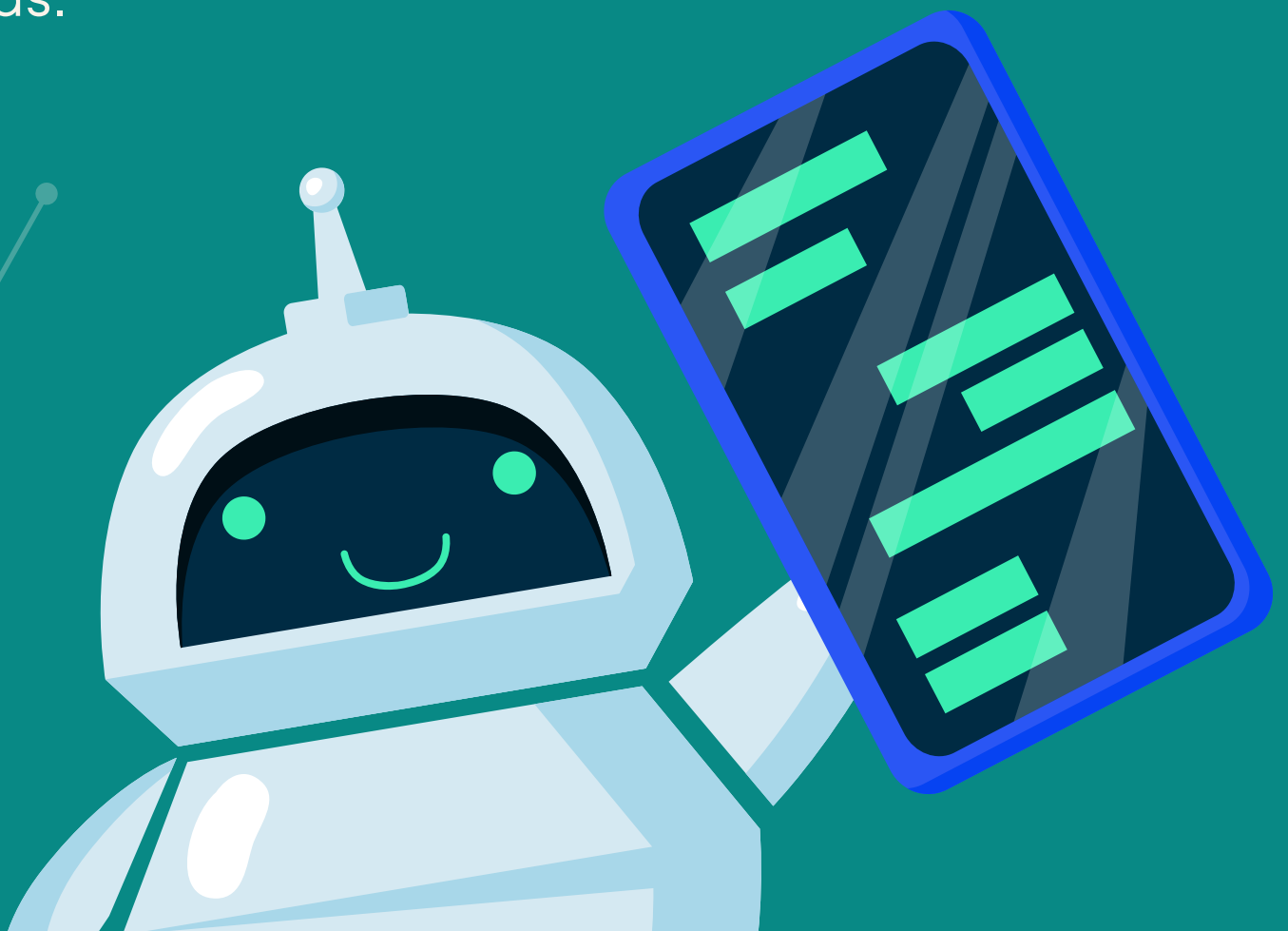


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How BCIs Connect Brain and Machine

Although still experimental, Brain-Computer Interfaces have revolutionized our outlook on the future, especially for specially-abled individuals. First conceived in the 1920s, BCIs enable direct communication between a human's brain and a computer, allowing users to control machines with their thoughts. By placing electrodes close to the synapses—the gaps between neurons—BCIs detect the frequency and intensity of each spike as neurons fire electrical-chemical signals. This technology is not only groundbreaking for people with severe neuromuscular disabilities, but also holds promise for national defense, such as hands-free drone control, and is being explored in countless other fields.

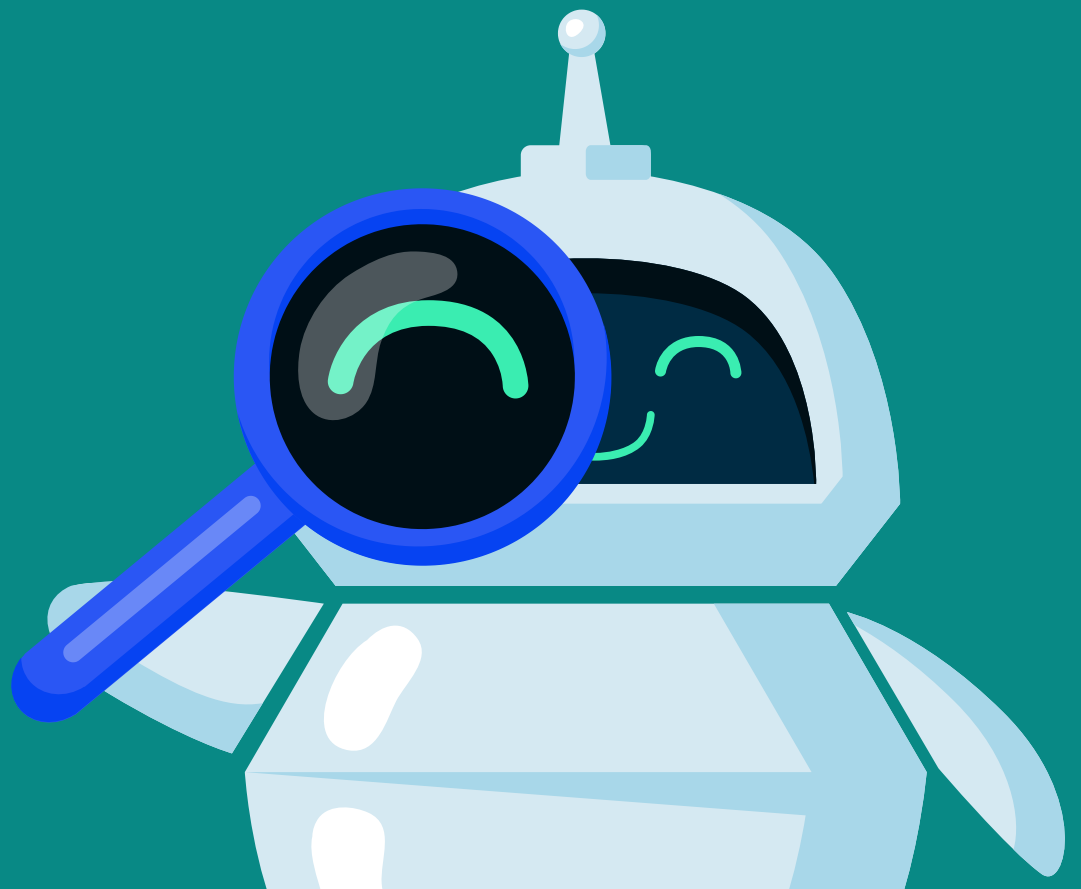


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Implanted vs. Wearable BCI's

Researchers have divided BCIs into two main types for easier exploration: implanted and wearable devices. Implanted BCIs are surgically attached to brain tissue, making them suitable for users with severe disabilities or physical injuries—like paraplegics who could regain motor capabilities by linking the BCI to specific neurons. While these devices provide precise control by measuring brain signals directly, they also carry significant surgical and post-surgical risks. Wearable BCIs, on the other hand, use conductor-bearing caps to measure brain activity from the scalp, making them ideal for applications like virtual gaming, augmented reality, and external machine control where a small margin of error is acceptable.



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