

Brain-Computer-Interfaces

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Research on BCIs began in the 1970s at the University of California, Los Angeles (1).



by The Brainstorms Scientific

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The first neuroprosthetic devices implanted in humans appeared in the mid-1990s

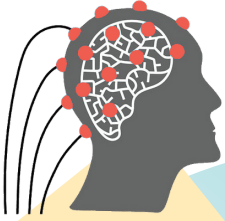
1969

The first successful biofeedback experiment was conducted on monkeys (2).

BCI and neuroprosthetics use similar methods and the terms are often used interchangeably

1875

Richard Caton discovered that the brain has measurable electrical activity.



Electroencephalography (EEG) records brain activity through electrodes attached to the skull (**non-invasive**) or implanted into the brain (**invasive**)

Brain-computer-interfacing (BCI) is technology that uses **brain activity** to operate an **external device** (3).

Most BCIs are **EEG-based**, some use eye movement or implants (e.g. auditory/visual aid)



Locked-in Syndrome



BCI technologies can potentially be used to find out if a pseudocomatose person is conscious or not. It can even help people with paralysis to communicate (4).

Neurofeedback & Neurogaming



Brain controlled games are rolling onto the market. Some of them are just made for fun, while other serve educational or therapeutic purposes, like training concentration in ADHD or meditation through neurofeedback (6).

Silent speech interfaces



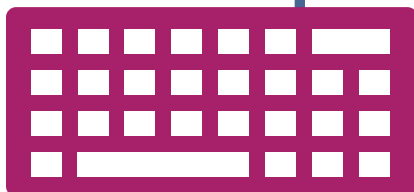
AI can learn to understand the electric activity of nerve endings in your jaw when you think certain words. BCI devices were created to use AI to learn to translate those signals into language (7).

Prosthetics

A major implementation of BCI technology is in prosthetics. From prosthetic arms that can sense touch, to BCI controlled wheelchairs and exoskeletons - the list of prosthetic devices is growing (5).

Art & Creativity

Artists have started using BCIs for their projects to create paintings, dancing robots and other fascinating objects with their brain activity.



References

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- 4) Chatelle C., Brain Injury, 2012.
- 5) Leigh R., Nature, 2012.
- 6) Ahn M., Sensors, 2014.
- 7) Kapur et al., 23rd International Conference on Intelligent User Interfaces, 2018