

The Brain Machine Interface: An Emerging New Technology

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Brain-machine interface (BMI) is a device that translates neuronal information into commands capable of controlling external software or hardware such as a computer or robotic arm. It is an emerging technology that facilitates communication between brain and computer and has attracted a great deal of research in recent years [2]. BMIs are often used as assisted living devices for individuals with motor or sensory impairments [1], hence improving the quality of their lives.

The BMI system comprises three fundamental components that serve specific roles: signal acquisition, signal processing, and application [3]. These components are interconnected and work together to allow the flow of brain signals to the target BMI application (e.g., robotic arm). In particular situations, control signals from the BMI application may be sent back to the brain to stimulate some common human functionalities, such as vision and hearing.

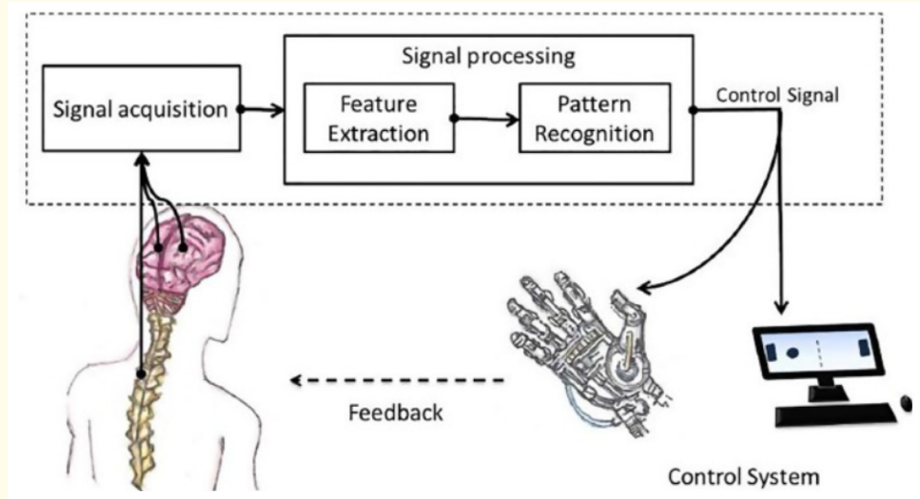


Figure a

Neuralink, cofounded by Elon Musk in 2016, had spent years developing and testing the BMI technology on animals before receiving FDA approval for human trials in May 2023. The first surgical implantation took place on January 28, 2024, at the Barrow Neurological Institute in Phoenix, USA on a quadriplegic

patient Noland Arbaugh. The two-hour surgery involved implanting a coin-sized chip beneath his skull, connected to over 1,000 electrodes that can read neural activity and translate it into digital commands [4-6].

Future applications of this promising technology in the fields of neurosurgery and neuro-rehabilitation remain to be seen.

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