

Bridge Between Brain and Computer

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Abstract: *The concept of a Brain–Computer Interface (BCI) represents a transformative advancement in human–machine communication. By establishing a direct connection between the human brain and external digital systems, BCIs enable control of computers, prosthetic devices, and robotic systems through neural signals—bypassing physical movement. This paper explores the fundamental architecture, signal acquisition techniques, data processing methods, and application domains of BCIs. A prototype model demonstrating the feasibility of translating EEG signals into machine commands is discussed, emphasizing system design, ethical implications, and real-world challenges. The study highlights the potential of BCI technology to revolutionize assistive communication, healthcare, and human–computer symbiosis.*

Keywords: Brain–Computer Interface (BCI), Electroencephalography (EEG), Signal Processing, Machine Learning, Neural Communication, Human–Machine Interaction

