

# **ABSTRACT**

## **BRAIN-COMPUTER INTERFACE**

For generations, humans have fantasized about the ability to communicate and interact with machines through thought alone or to create devices that can peer into person's mind and thoughts. These ideas have captured the imagination of humankind in the form of ancient myths and modern science fiction stories. However, it is only recently that advances in cognitive neuroscience and brain imaging technologies have started to provide us with the ability to interface directly with the human brain. Primarily driven by growing societal recognition for the needs of people with physical disabilities, researchers have used these technologies to build brain computer interfaces (BCIs), communication systems that do not depend on the brain's normal output pathways of peripheral nerves and muscles. In these systems, users explicitly manipulate their brain activity instead of using motor movements to produce signals that can be used to control computers or communication devices. The impact of this work is extremely high, especially to those who suffer from devastating neuromuscular injuries and neurodegenerative diseases such as amyotrophic lateral sclerosis, which eventually strips individuals of voluntary muscular activity while leaving cognitive function intact.

However, with today's developing technology, it hasn't only been used for this purpose, and has started to use a lot of different areas from advertising, smart peripheral systems, to games, even authentication and security applications. The increase in access to BCI devices, together with the increase in usage, has led to an increase in the number of applications that have been made with health, engineering and education. We hope that in the near future the devices we can negotiate without talking to the BCI will work towards the direction of our thoughts.

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