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Neuralink's Brain-Computer Interface: Revolutionizing Technology and Raising Ethical Questions

Neuralink, a brain technology company, founded by Elon Must, has gained significant attention for its ground-breaking work in brain-computer interfaces (BCIs). As Ryan Knutson from *The Wall Street Journal* podcast aptly puts it, Neuralink's goal is to "mind meld with computers." Recent developments, such as a paralyzed patient, known only as Alex, controlling the video game Counter Strike 2 using his mind, have showcased the immense potential of this technology. However, Neuralink's journey has not been without controversy, including concerns about the safety of its surgical procedures and ethical debates surrounding animal testing. This paper reviews Vice's article, "Neuralink Patient Using His Brain Implant to Play Counter Strike 2, " to better understand the technology behind Neuralink and the controversies surrounding its development.

In August 2024, Neuralink achieved a major milestone in its research when Alex, it's second patient, successfully controlled the game Counter Strike 2 using the Neuralink implant. Alex, paralyzed from the shoulders down after a spinal cord injury, has found new ways to interact with digital environment, such as web browsing and video games. His brain implant allows him to aim in the game purely through thought, while a specially designed mouth joystick enables him to move his character within the game. This breakthrough highlights the potential of

Neuralink to empower people with disabilities to interact with technology on a deeper level (Vice, Euronews).

Neuralink's primary goal is to restore functional independence for individuals with severe disabilities by enabling direct brain control of digital interfaces. The technology that enabled Alex's success is based on a small implant that reads brain signals and translates them into digital commands. The devices is about the size of a quarter and is equipped with approximately 60 electrodes, each thinner than a strand of hair, which attach to the brain. A robot was even built to facilitate this neurosurgery. Looking forward, Neuralink aims to expand the technology's capabilities to allow full control over video games and robotic devices such as powered wheelchairs and robotic arms - potentially even the ability to drive a Tesla (Decrypt, Euronews, Wall Street Journal).

Despite its recent successes, Neuralink has faced significant technical challenges. For instance, the first patient to receive the implant, Noland Arbaugh, experienced issues when approximately 85% of the electrodes detached from his brain, severely affecting the device's functionality. Neuralink has since resolved these issues, ensuring that Alex's implants remain fully functional without similar setbacks (Vice, Euronews).

In addition to technical challenges, Neuralink has been at the center of ethical debates, particularly concerning the safety of its procedures. One of its co-founders, Benjamin Rapoport, left the company citing concerns over the invasiveness of Neuralink's techniques. Rapoport argued that safer alternatives exists for connecting humans with computers. Moreover, Neuralink's testing practices have come under scrutiny, with reports claiming that over 1,500 animals died during eth development of its technology. This has let to outcry from animal rights groups, raising serious ethical issues about the methods used in BCI testing (Decrypt).

The development of Neuralink also brings forth broader ethical issues about the future of BCIs. Concerns range from patient safety and long-term effects of implanting devices in the brain to the potential misuse of technology. Privacy issues are especially pertinent, as these devices could theoretically collect sensitive data on users' brain activity. As BCIs become increasingly integrated into human life, oversight and regulation will be crucial to ensure that the technology is deployed ethically and responsibly (Decrypt, Euronews).

Neuralink represents a fascinating fusion of cutting-edge science and controversy. The technology's ability to transform lives, as seen in Alex's case, is undeniable. However, unresolved questions about safety, ethics, and long-term implications must be addressed. As Neuralink continues its development, a balance between innovation and safety must be struck to ensure that the technology is not only effective but also ethically responsible.

Works Cited

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