

BSC COMPUTER SCIENCE

ETHICAL AND PROFESSIONAL ISSUES IN COMPUTING AND DIGITAL MEDIA

ETHICAL ISSUES OF BRAIN-COMPUTER INTERFACES

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Contents

Introduction.....	3
Benefits.....	3
Ethical Issues	
1. Control.....	4
2. Privacy.....	4
3. Digital Divide.....	5
4. Morality.....	6
Regulations and Responsibilities.....	6
Legal Challenges.....	7
Ethical Matrix.....	8
Conclusion.....	8
References.....	9

Word Count: 2012

INTRODUCTION

Neural Interfaces or Brain-Computer Interfaces are devices that interact with our nervous system. It is a method where neural activity generated by the brain is used for communication. Currently, BCIs are mostly used by people with disabilities—current BCIs aid users in communication, daily living activities, movement, etc.

Elon Musk has described his BCI device, NeuraLink, as a FitBit in the skull. This statement implies that in the future, BCIs can be like the IoT devices we use daily such as smartphones or smartwatches. As we can interact with technology directly using these devices, our lives will be much easier. For instance, we can type using our brain, or even better; we could transfer thoughts, ideas, and emotions from one person to another.

BENEFITS

One of the main reasons BCIs are so intriguing is that it can allow us to do things that other technologies cannot do. In the future, BCI devices may be used so extensively; doctors may write prescriptions for neural interfaces rather than for drugs.

As BCIs can enhance the brain's functionalities, it can help create better thinkers, better detectives, better artists, etc. It can also help humankind negotiate better and come to terms with each other, resulting in less conflict between groups. It can lead to better decision making leading to well-governed companies, businesses, etc..

BCIs can help people regain lost abilities. Imagine a disabled military veteran who has gained the ability to walk or a blind person gain sight and see a loved one for the first time. All this is possible through BCI technology.

It can also be used to train the human brain, improving concentration or memory. This means a workforce can also be reskilled or upskilled by inserting new knowledge and experiences into their brain. BCIs are a technology that has incredible potential. This technology potentially offers everything from human memory recording, enhancing perceptions, controlling external devices using thoughts, controlling human emotion, and even streaming music directly to the brain. However, it also raises many ethical concerns, some of which will be discussed in the next section.

ETHICAL ISSUES

1. CONTROL

A lot of BCI research has been geared towards disabled people. Through direct interaction with robotics, disabled people can perform tasks that they cannot perform otherwise. Therefore, from a utilitarian perspective, this can be considered ethical as the outcome is very positive.

In some cases, implanting BCIs gives some control of the subject's mind to the device. From a deontological perspective, this can be considered unethical, as this means allowing something else to control the person. In the future, as this technology develops further, we will be able to alter our moods and emotions using BCIs. Humans are not always in control of their emotions or moods and sometimes regret their actions in hindsight. Therefore, from a utilitarian perspective, having more control over the human brain can be considered ethical because it gives more control of the brain to the user, helping them suppress negative emotions or thoughts.

BCI companies are still companies with a profit motive. Therefore, they could use these devices in the company's best interest rather than in the user's best interest. This could result in users becoming dependent on BCI companies. In addition to BCI companies, governments and other parties could also use BCIs to control others. Therefore even though what we seek is positive and ethical, the consequences can make it unethical to implant BCIs.

2. PRIVACY

Privacy is a huge concern even in our current state, where social media companies are using personal user data for their benefit. Neural data collected can be considered more private than data collected through other means such as social media. Therefore, such a data breach can violate privacy, especially intimacy, on an unprecedented scale. Even though intimacy is the privacy state that is most significantly affected by BCIs from the four states of privacy defined by Alan Westin, other privacy states also can be affected. Neural data collected can gather information about a person's mood, emotions, or even memories. This data can then be used against them for nefarious purposes such as blackmail.

Elon Musk has said that a Neuralink would be able to record and replay memories in the future, even save them to an external drive and download them into a robot body. This would allow people to share their memories with others. It also raises the possibility that contextual integrity could be violated. Contextual integrity is a privacy theory developed by Helen Nissenbaum, which proposes privacy as appropriate information flow. Contextual integrity is violated when the informational norms associated with a specific social relationship are breached. Therefore, if a person shares intimate memories with a recipient through BCI and that recipient shares those memories with the public, that would result in inappropriate information flow. Hence, the contextual integrity norm is violated.

In addition, the ability to store and share memories could mean that hackers could hack their way in and access a person's most intimate memories and desires. Moreover, parents could also use these devices for surveillance of their children and employers for the surveillance of their employees. Even without these interfaces, we see a trend where employers increase the workforce's surveillance like keeping track of how many hours employees sit in the chair or demanding employees to keep their camera and microphone on while remote working. Employers can adopt new unorthodox methods of surveillance when BCIs become normal.

3. DIGITAL DIVIDE

The digital divide is a term used to describe the discrepancy between people who have access to and resources to use new technology and people who do not have the resources and access to use new technology. Crucial areas such as education, health care, and labor productivity can be considerably enhanced by using BCI technology. Therefore, it can be considered ethical from a utilitarian perspective.

However, it can be considered unethical from a deontological perspective as it can further increase the gap between people with access to technology and people who do not have access to technology. Even now, we are seeing that everyone does not have equal access to information and technology. With the potential of this technology and the abilities it can give to its users, it can usher in a new age of more significant digital divide. BCIs are considered luxury commodities. So they may never be equally distributed. Therefore, it can be regarded as a Mercedes divide. Everyone likes to have one but cannot afford one.

4. MORALITY

When developing new technologies, researchers sometimes get carried away by how the technology can be used for good and sometimes do not pay enough consideration to how it can be used for malicious purposes. Suppose an ordinary person can use BCIs to do things he was not capable of doing before. In that case, it also means that a criminal or offender could use the same technology to commit crimes and hide from justice. It could make it more difficult for investigative agencies to investigate such cases, and it could pose difficulties in bringing people to justice. Does this mean that investigative agencies should have detectives and officers with neural implants so that both parties are on the same playing field?

An alternative could be to program the BCIs to alert agencies when a person commits a crime or counter violent impulses by calming the BCI-implanted person. Even though this can be considered ethical from a utilitarian perspective as it prevents a crime, it can be considered unethical from a deontological perspective as it requires the device to control the user's mind.

As this mostly depends on the BCI-implanted person, this means that virtue ethics also plays a vital role in deciding whether BCIs are ethical or not. Virtue ethics mainly deals with the honesty and morality of a person. This means that a large part of how ethical the use of this technology also depends on the virtues of the person using the device.

REGULATIONS AND RESPONSIBILITIES

One of the first approved uses of BCIs was in 1997. The US Food and Drug Administration (FDA) approved the use of Deep Brain Stimulation (DBS) to suppress local neural activity in people with Parkinson's disease. Since then, the DBS has been approved to be used in other conditions such as obsessive-compulsive disorder and epilepsy.

Moreover, Neuralink has been approved as an FDA Breakthrough Device. The process of primary approval is accelerated by this approval, meaning we could see devices such as Neuralink approved by FDA sooner than later. However, the FDA's process of approval is still very complex. It is not just the BCI devices that require approval from the FDA. Equipment used to implant these devices, such as Neuralink's sewing machine, has to go through approval protocols. Authorization from the FDA should be sought before any tests are done in humans, as inserting objects into the brain creates safety issues like damaging neural tissue or causing an immune reaction or infection in the brain. (Lucille M. Tournas, Walter G. Johnson. 2019). Due to this technology's potentially dangerous nature, it has to go through the most stringent approval protocols of regulatory bodies.

Furthermore, individuals who are getting implants also have many responsibilities. They have to use these devices morally. Therefore, a large part of the argument of whether BCIs will do more good than harm largely depends on the virtues of the person using the device.

LEGAL CHALLENGES

1. PRIVACY

BCI devices cannot function properly without monitoring the neural activity of the user. As this is very sensitive and private data, new laws and regulations will need to be passed to safeguard the right to privacy. Protecting privacy is also essential for users to function normally without the fear of being exposed, and therefore, this can also be justified biologically.

2. FREEDOM OF THOUGHT

In the context of BCIs, the right to freedom of thought and right to privacy are interconnected. In the past, thoughts were considered private by nature and not accessible to anyone else. However, technological means have changed the situation (A. Krausová, 2014). BCI can have a severe impact on a person's intelligence, emotions, identity, et... Hence new legal measures have to be taken to protect the users' freedom of thought.

3. FREEDOM OF EXPRESSION

For a BCI device to be used effectively, a user may be required to think in a specific manner. This might limit the user's freedom of expression. Currently, ideas and thoughts are considered immaterial. However, in the future, recorded brain waves representing a person's thoughts and ideas can be regarded as forms of material expression. Therefore laws and regulations have to be passed to protect users' freedom of expression.

ETHICAL MATRIX

STAKEHOLDERS	WELLBEING	AUTONOMY	JUSTICE / FAIRNESS
USERS	Enhance abilities and treat disabilities	Control and discretion	Security and privacy
SOCIETY	Health, Communication, Interaction	Connection	Inequality, Power distribution
GOVERNMENT	Informed Decision Making	Access to Alternative Solutions for problem-solving	Power distribution, Availability of Advanced technology
ORGANIZATIONS	Efficient workforce	Workforce monitoring	Availability of Advanced technology
BCI INDUSTRY	Income and working conditions	Freedom of Action	Fair Laws and Regulations

CONCLUSION

In our current state, technologies such as social media are not appropriately regulated, raising many ethical concerns. It can be argued that BCIs will be even harder to regulate appropriately. Therefore it is crucial to have laws and regulations to make sure this technology is not exploited.

If used immorally, BCIs can damage people's lives in ways that were not possible before. Therefore, special ethical consideration has to be taken in implementing this technology. Whom do we give access to this technology? Do we disallow people with criminal records from accessing this technology? Or do we use this technology to make them more moral? How much control should both the user and the device have over the brain? How should the collected data be treated? These are all critical questions to which answers are not crystal clear. Some of it can be considered ethical from a utilitarian perspective, while for others, it is ethical from a deontological perspective. Virtue ethics also plays a significant role in this as a lot can depend on how moral the BCI-implanted person is.

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