

# AN ETHICS OF ALGORITHMS FOR BRAIN-COMPUTER INTERFACES

An increasing number of scholars examine the ethics of using algorithms in a wide range of contexts. In this study, we explored which ethical issues emerge with regard to algorithms and their use in brain-computer interfaces (BCIs).

**Reference:** Wolkenstein, A., Jox, R. J., & Friedrich, O. (2018). Brain-Computer Interfaces: Lessons to Be Learned from the Ethics of Algorithms. *Camb Q Healthc Ethics*, 27(4), 635-646. [DOI:10.1017/S0963180118000130](https://doi.org/10.1017/S0963180118000130)

## WHO SHOULD READ THIS?

This paper could be informative for philosophers of technology as well as programmers and information scientists. Because it discusses ethical challenges, this paper is also relevant for scholars of medical ethics and applied ethics, policy makers, and the general public.



## WHAT IS IT ABOUT?

An **algorithm** is a complex chain of calculations programmed into a computer. Based on previous work on algorithms in general, the paper applies an ethical framework to the development and use of **algorithms in BCIs**. There are potential ethical and societal problems in this domain (e.g. lack of algorithm comprehensibility for experts and users).

## WHAT DID THE RESEARCHERS DO?

We analyzed published work on the ethics of algorithms. We then identified ways of deploying algorithms in BCIs and asked whether these applications pose the same kind of questions found in the more general work. We also discussed whether and how generic solutions to the ethical problems with algorithms are also viable in the context of BCIs.



## WHAT DID THE RESEARCHERS FIND?

The ethics of BCI algorithms are similar to those in the general ethics debate, but also present some specific issues. For instance, the mechanisms of BCI algorithms are not entirely clear to users, which might pose a safety and responsibility problem for the deployment of BCIs. We discuss the idea of a veto command as a solution.

## WHAT NOW?

The paper is a first attempt to use the growing literature on the ethics of algorithms for assessing the ethics of BCIs. Apart from issues known from medical ethics, BCIs raise many questions that involve the deployment of technology as such. Since algorithms play a crucial role not only in BCIs, their impact requires further study.

