Mapping ethical issues in the research, development, and use of speech neuroprostheses

Shu Ishida

Uehiro Division for Applied Ethics, Graduate School of Humanities and Social Sciences, Hiroshima University

URL: https://researchmap.jp/shuishida/
E-mail: shuishida@hiroshima-u.ac.jp

Abstract:

With rapid progress in understanding the neural dynamics of speech motor control in the human brain, the possibility of restoring communication for people with dysarthria has been extensively studied. Such communication-assisting neurotechnologies include "speech neuroprosthesis," a specific type of brain-computer interface (BCI) that decodes brain signals during attempted speech into texts or synthetic speech sounds and thereby restores real-time verbal interactions. However, contrary to the landmark achievements in the scientific and technological aspects of speech neuroprosthesis, limited attention has been paid to the unique ethical, legal, and social considerations underpinning the responsible research, development, and use of this assistive neurotechnology.

Here, our study first lays out unique ethical issues that may arise during the respective stages of research, development, and use of speech neuroprosthesis, drawing on the findings about the ethical aspects of other assistive technologies, such as neuroprosthesis restoring motor functions. Subsequently, the recent dispute over how BCI-mediated speech can constitute the user's authentic testimony is examined. We elaborate on the normative features and worries of speech neuroprosthesis (either text-based or acoustic), which we compare with other communication-assisting methods like eye trackers, text-to-speech devices, and interpretation by caregivers. In conclusion, we offer several suggestions for the responsible use of speech neuroprosthetics, highlighting its potential benefits in creating an inclusive society while also noting the importance of modest and realistic anticipation of the specific ethical considerations involved in this fast-evolving neurotechnology.

Biographical information:

Dr. Shu Ishida is an Assistant Professor (Special Appointment) at the Uehiro Division for Applied Ethics, Graduate School of Humanities and Social Sciences, Hiroshima University. Prior

to joining the university, Ishida has been affiliated as a project-based Assistant Professor with Tohoku University and Osaka University, respectively. Ishida received a PhD in Philosophy from the University of Tokyo in 2022. With a background in Ethics, Ishida primarily works on normative issues related to well-being, discrimination, disability, and other bioethical topics. Ishida's research interest also concerns the role of ethicists in the contemporary normative discussion concerning science and technology.