Mind reading via EEG – legal, ethical and practical matters

Summary by Francisco Javier López Guzmán (researcher at VUB, LSTS, HALL)

On 4 November 2020, the Brussels Privacy Hub and the Health and Ageing Law Lab (HALL) held the webinar "Mind reading via EEG – legal, ethical and practical matters".

Due their non-invasiveness, portability, low cost, and outstanding temporal resolution, electroencephalography (EEG)-based tools are now applied not just in the medical sector but, for example, in meditation, education, or for the creation of immersive and emotion-adaptive 'neuro-environments'.

By joining experts with different backgrounds, and illustrating the various application of EEG-based tools in multiple fields, the event was aimed at discussing the legal, ethical and practical implications of mind reading via EEG.

The invited speakers were **Laura Seynaeve**, Professor and neurologist at UZ Brussel, **István Böröcz,** researcher at VUB, **Yash Shekhawat**, technology expert at Nurogames and at MindSpaces project and **Andrea Bertolini,** Assistant Professor at Sant'Anna Pisa). **Paul Quinn**, Professor at VUB, chaired the discussion.

Paul Quinn opened the event stressing that privacy is facing new challenges as technology develops and brings possibilities that once could only be envisioned. The privacy of the mind and some features of the human brain itself are currently being explored. In the history of philosophy, biology and medicine, the exploration of the brain, of emotions and of thoughts have been present and under development. Technologies such as electroencephalography (EEG), combined with recent developments of algorithms and artificial intelligence (AI), are now expanding these research and medical capabilities.

Laura Seynaeve exposed the current medical uses of EEG and the state of art of this technology. EEG has been used for the last century for examining the electrical functions of the human brain. The basis of the physics and the technique have remained the same since it was invented. Electrodes are located on the head of the patients and amplify the signals digitally. But nowadays, the combination with other technologies allow diagnosis and prognosis of a various range of diseases, syndromes and human conduct problems, such as epilepsy and the study of the effect of medication. There are advantages of the use of this technology, such as its non-invasive use and the high temporal resolution. But there are also disadvantages: repeated measures and a reduction of the external noise are needed. Until now, medical doctors can see that an individual is thinking, and which part of the brain is using for it. Not yet what he or she is thinking.

István Böröcz exposed a legal analysis of the EEG neuroimaging under the General Data Protection Regulation (GDPR) of the European Union (EU). Some of the extra-medical uses of EEG where exposed, such as its use for meditation and personal identification. The use of brain signals data could be enough to identify a person. Under the GDPR, this would mean a processing of personal data with high privacy implications. There are three elements affecting the identifiability of an individual and the categorisation of EEG data as personal data: the adequacy of the neuroimaging tool, the accuracy of the method used to understand EEG data and the

changes evoked in the data comparison by time. Furthermore, EGG profiles may be unique per individual and have genetic components. Some of them may reveal political opinion as well. This would entail their categorisation within special categories of personal data, and trigger specific safeguards eventually.

Yash Shekhawat narrated his experience in gaming industry and MindSpaces project. Projects such as MindSpaces aim to create a novel approach to urban and architectural design combing 3D-VR and Emotional Analysis performed via EEG tools. VR and EEG analysis are currently under development to study and manipulate human emotions. Also the industry of videogames is interested in the behavioural and emotional output of different locations for an individual.

Andrea Bertolini discussed the ethical implications of the use of EEG data, particularly in connection with VR. He analysed the broader legal framework and the principle of human dignity and informed consent in contrast with these technological developments. All these through the comment of some relevant EU constitutional and European Court of Human Rights case-law.

Some questions of the audience revealed important details and helped the experts to reflect on the EEG data being used on simulation of persons, neuroplasticity, classifying datasets from the legal point of view and neurofeedback in gaming.