NEURO-TRACES

Artistic-technological research project
VR Application and Media Installation
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work in progress, 2020-2021

Neuro-Traces is an artistic-technological research project and installation, focusing on a customized virtual spatial design based on individuals' sensations of well-being.

The project arises from an architectural background, where we question the social and physical boundaries upon which our world is constructed. As a society, we are inhabiting spaces constituted by economical, political and social parameters that result in efficiency and profitability instead of the physical and psychological aspects of the human being. As a response to this, we offer a (re)active process which aims to design an individual and abstract landscape where the visitor feels well inside. By understanding the virtual environment as a void which is liberated from any rules, we replace static elements such as walls, ceilings, or buildings, with dynamic sensations of volume, density, and movement. Virtuality gives us the possibility to experiment with a process of spatial formation dependent upon the personal sensation of well-being.

Neuro-Traces is realized in the form of an interactive installation combining both: BCI (Brain Computer Interface) and VR. The installation offers the visitor a completely individual and immersive experience, where the virtual configuration reacts to the positive feelings of the visitor's well-being. An EEG is used to record electrical activity in the cortical areas of the brain, focusing on measurements based on the Valence-Arousal model of emotion. Coupling the EEG, with an Artificial Neural Network, a generative design algorithm is used to create a constellation, which corresponds to the individual's well-being. This is based on classified brain states that correlate to moods of relaxation and tranquility. Here the classifications are used as Feedback for the proposed design on which the script can react. The aim is to find an equilibrium between the abstract virtual formation and the affective sensation of the person's well-being. Both the visitor and virtual formation engage in a continuous process of reciprocation, influencing and being influenced by one another. The virtual simulation gauges the affective sensation of the visitor in order to generate personal configurations occurring uniquely in real-time in every instant. By using the medium VR, the installation goes beyond static and restricted occurrences of the physical space, showing an abstract landscape in a reciprocal state of adaptation. All processes take place in real time.

Contrary to classic Neurofeedback applications, Neuro-Traces is not merely interested in the empirical data visualization and neurological impulses, or derived control commands, but rather in experimenting a reactive design process, where the simulation tries to understand the affective sensation of the visitor and to adapt accordingly. Despite the diverse BCI projects that have been developed over the past decade, we position ourselves as a young, interdisciplinary team crossing the fields of art, science and technology. Initiated from an architectural background, the project provides a novelty approach to exploring the psychological influence of space in our personal sensation of well-being.

Neuro-Traces is currently being developed by a small core team based in Vienna and Graz, merging the areas of Art, Design, Neuroscience and Programming. Our common motivation is to address new possibilities and perspectives on artistic-architectural and spatial perception so as to propose alternative views on the way the world is shown to us. The project won the Content Vienna Award 2020 from the Vienna Business Agency and is partly funded by the City of Vienna. A first finished prototype will be completed by March 2021.

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