

Image of the Forest

Brain-Computer Interfaces and the Explainability of Interaction with Artificial Nature in XR.

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FIG. 1 Visualisation of the 'animation object' that responds to the electroencephalography (EEG) data recorded during the interaction with images of artificial nature. Eight knot strings are parametrised and respond in real time to data streamed from the eight EEG channels (F3, F4, Fp1, Fp2, F7, F8, AF3, AF4).

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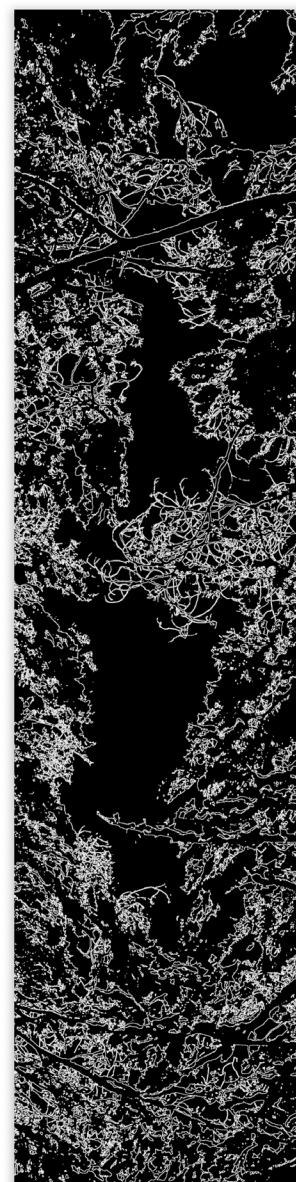


FIG. 2 Gallery view showing how the global and detailed complexity of the texture in the dataset images changes, from high complexity to minimal complexity.

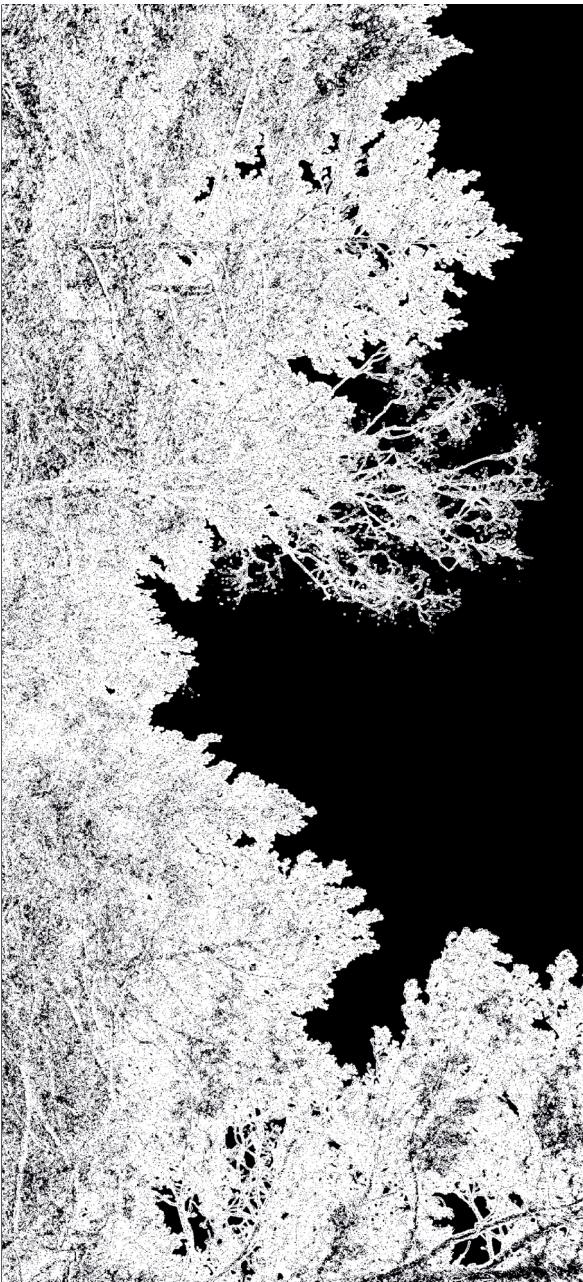


FIG. 3 Kaleidoscope view of the visual stimuli used to reflect the changes in the brain activity detected by the affective computing module.

ABSTRACT

The adoption of artificial intelligent systems is growing. An average person spends significant amounts of time interacting with content that is generated with the use of machine learning (ML) as opposed to the human-created information. However, the principles for explainable design are still not well developed. Many questions persist on the ways in which the information processing by the ML models can become more transparent and interpretable.

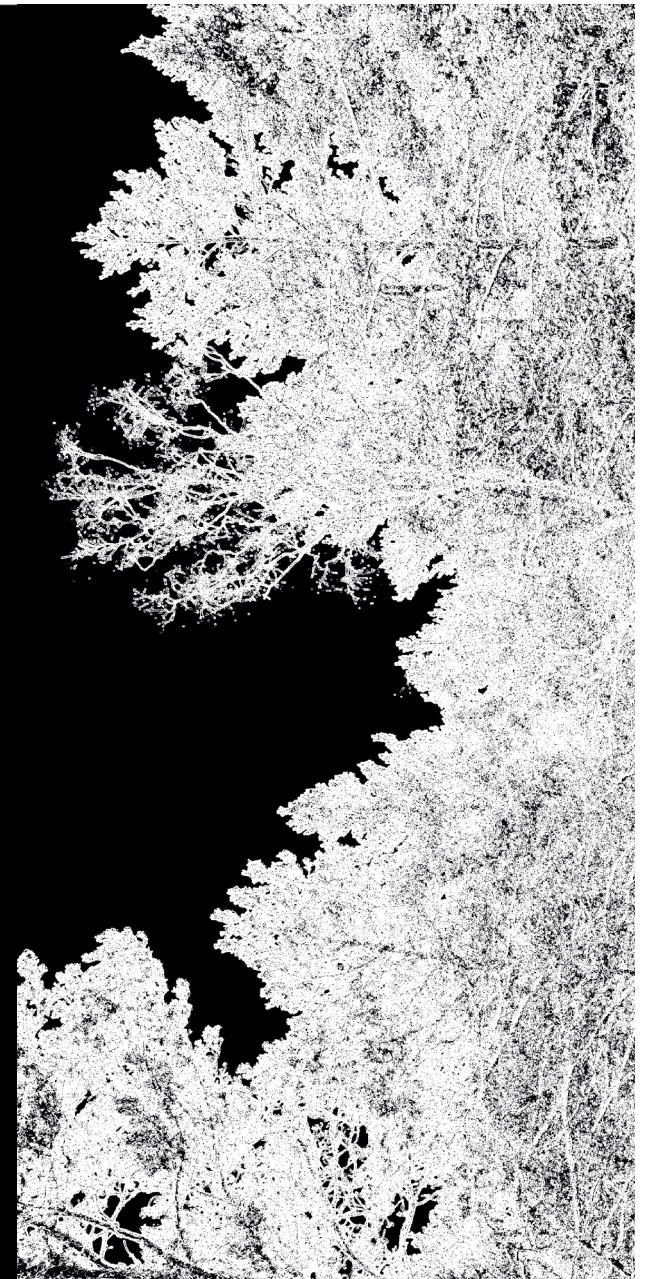
Image of the Forest proposes a novel evidence-based design framework that tackles the issue of objective measurement of the effects that the deployment of explainable principles has on the interaction with extended reality (XR) experiences. Using affective brain-computer interfaces (aBCIs) and the computationally generated artefacts that mimic aspects of nature, we aim to critically reflect on achieving the balance between the artistic expression and explainable design. Furthermore, we use the framework of design futures to speculate on how physiological communication with artificial intelligent systems can be both transparent and invisible; to achieve the principles of *bionic design* - systems that augment and extend human capabilities.

Keywords

Explainable AI, Brain-Computer Interfaces, Digital Art, Design Futures.

CSS Concepts

Human-centred computing → Human-computer interaction (HCI); *Affective computing*



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FIG. 4 Website interface for the study. The shape, motion, and opacity of each ring is driven by the neural activity recorded during exposure to forest imagery.