

OpenViBE : An Open-Source Software Platform to Easily Design, Test and Use Brain-Computer Interfaces

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In this poster we describe OpenViBE1 (1) (2): an open-source software platform for the design, test and use of Brain-Computer Interfaces (BCI) (3) and Neurofeedback.

OpenViBE is a software platform for the acquisition, pre-processing, processing and display of cerebral data (EEG, ECoG, MEG, etc). The platform consists in a set of software modules that can be integrated easily and efficiently, in order to design real-time applications for neuroscience including Brain-Computer Interfaces and Neurofeedback.

APPROACH DESCRIPTION. The OpenViBE platform is based on a modular approach that allows large extensibility and configurability. The key features of the platform are: a) multi-sensory feedback based on Virtual Reality displays, b) parallel architecture on dedicated hardware such as hyperthreading, multi-core and clusters for improved performance, collaborative work and remote communication, c) multiple-users facilities for a wide range of users including: software developers, researchers, practitioners (non-programmers), etc.

FUNCTIONALITIES include: a generic signal acquisition server (compatible with several acquisition machines), a scenario designer (to create, monitor and tune the BCI scenario – see Figure 1a), Neurofeedback or BCI scenarios, including if necessary Virtual Reality components and displays (see Figure 1b). The signal processing modules intend to provide various techniques for denoising, source localisation, features extraction, classification, etc. The software is both hardware and operating system-independent. We address the uses of: plug-in developers, BCI scenario authors, clinicians and operators, BCI end-users by providing them with dedicated tools.

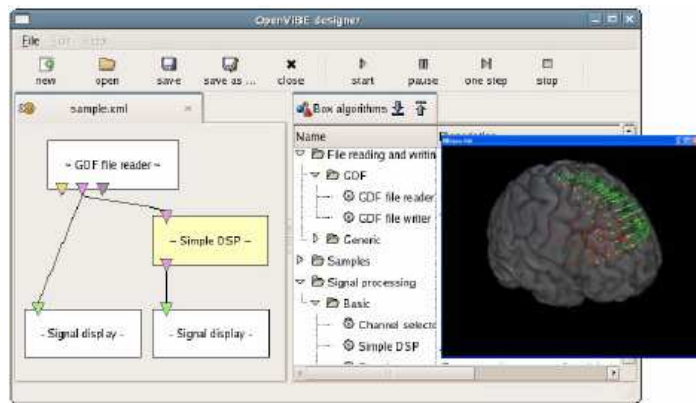


Figure 1: (a) The OpenViBE-designer, (b) VR Neurofeedback application using an inverse model

CONCLUSION Open-ViBE is an open-source software dedicated to the design, test, and use of Brain-Computer Interfaces. Key aspects of this software are: its modularity, its extensibility, its scalability, its close relation to virtual reality, its user-friendliness, and its wide range of potential users. It will be soon available online on the INRIA gForge. More information on this project can be found on the OpenViBE website (1).

REFERENCES

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