FENS Forum 2008

For posters, morning sessions: 9:30-13:30; afternoon sessions 13:30-17:30.
Authors are expected to be in attendance at their posters at the time indicated.
For other sessions, time indicates the beginning and end of the sessions.

First author Sanchez-Vives, Maria V. (poster)

Poster board G7 - Tue 15/07/2008, 12:15 - Hall 1
Session 161 - Techniques 3
Abstract n° 161.7
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Title Virtual reality for the study of neuronal structure.

Text Confocal or two-photon microscopy yields imaging data used for quantification of e. g. neuronal parameters. Most often the software used for visualisation does not provide a real 3D reconstruction, much less a stereoscopic visualisation with a flexible user interaction. Here, neuronal images obtained by confocal microscopy were analysed in 3D reconstructions visualised in different media: 1) Desktop: A non-stereoscopic 3D reconstruction on a computer screen that could be moved closer or further away from the user, 2) Fishtank: A 3D reconstruction including all features of the Desktop plus stereoscopy and a head-tracking system allowing for head-movement parallax, and 3) CAVE: a projection based virtual reality system that has three back-projected vertical screens and a floor screen with stereo projection and head-tracking, where neurons were interacted with and visualised at human size. For the comparison between different media, two tasks were given to the participants: 1) Quantification of dendritic spines from a cortical pyramidal cell, and 2) Quantification of the number of putative synaptic contacts between tyrosine-hidroxilase positive axons and the dendritic arbor of a pyramidal neuron. Twelve participants participated in the experiment in which the utility of the different media were evaluated. Our study found that for every task the media with stereoscopic 3D reconstructions and head-tracking proved to be the preferred ones. With these, naïve subjects were able to perform a task such as counting dendritic spines with the same accuracy and several times faster than experts. Given a forced choice of which of the 3 systems to use for further tasks of the same kind, the CAVE was chosen 67% of times and the fishtank 31%. Therefore, the multidisciplinary integration between virtual reality methods and biological data can provide powerful tools for analysis expanding the potential of techniques such as confocal microscopy. Supported by DOE Award DEFG02-03ER25582.

Theme G - Techniques, history and teaching
Neurotechniques