Laboratory for
Human Brain
Dynamics

INFORMATIONAL SHEET

"Dynamic Electric Field Tomography (DEFT) and its applications"

ΕΠΙΧΕΙΡΗΣΕΙΣ/ΠΡΟΪΟΝ/0311/42

Electroencephalography (EEG) and Magnetoencephalography (MEG) are the only non-invasive techniques used to measure ongoing human brain activity with millisecond time resolution. Our pilot studies have shown that MEG and EEG contain similar information, but no EEG technique to date can yield as precise images as the method of Magnetic Field Tomography (MFT) with MEG signals. The current study aims to develop algorithms for EEG signal analysis, initially based on MFT, and to apply them to important and difficult clinical applications.

We will use this method on high quality data collected using a multi-channel EEG system and data collected with fewer electrodes. The adaptability of this method will allow for its application for both research purposes and clinical applications. In high density EEG, the DEFT method will be used in neuroscientific studies, while in low density EEG, this method will allow for a quick and efficient application. As a result, it will now be possible to measure brain activity in a way that was not available before.

In addition to the theoretical part of the study, we will collect data from people with special conditions, abilities and needs and from a control sample of subjects. We wish to include people that may benefit most from EEG measurements and our methods of analysis in the future, for example, autistic and cerebral palsy patients and patients with specific motor and sensory skill impairments (e.g. blindness and paralysis). We invite especially, subjects with special conditions (e.g. dyslexia, inability to recognise faces/objects) and special abilities (e.g. photographic memory, exceptional arithmetic skills). Data collection is expected to begin within the next 3 to 6 months, after we install the appropriate equipment required for the special needs of our participants, thus facilitating data testing. The participation of patients with special conditions is especially desired, since it will allow for the evaluation on groups which in the future will most benefit from DEFT.

The DEFT project will make most impact on applications such as Brain-Computer-Interface and neuro-feedback, for example for the restoration of impaired activity after a stroke. The in-depth analysis of successful versus unsuccessful cases is what is missing from such applications today. DEFT is ideal for this purpose: it will make the detection of activity from specific brain areas and target the neurofeedback signal to these areas possible.

For more information, please contact us by email info@aaiscs.com or by phone 22460228.

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οι ιδέες μας, πρόξη και ανάπτυξη