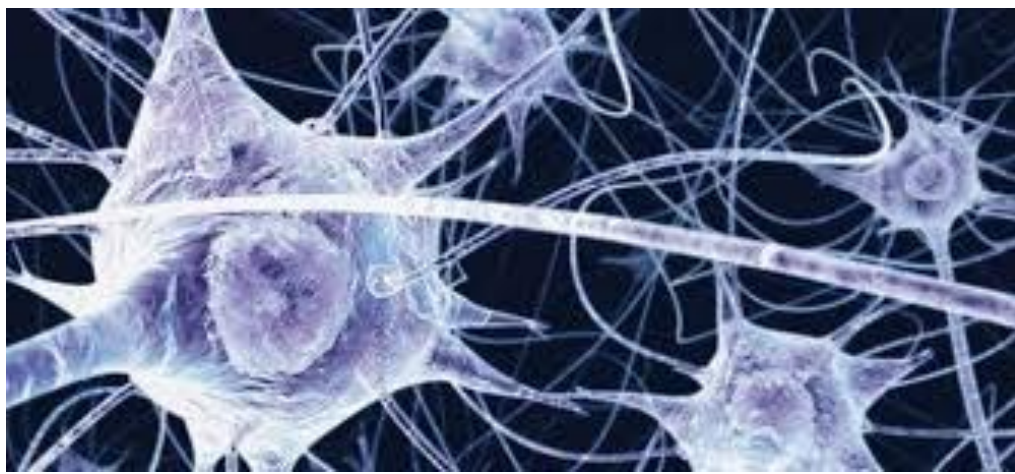


Motor-Recovery Applications Based on Brain-Computer Interfaces

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This research offers some results of a work that aims to use Brain - Computer Inter-faces to facilitate rehabilitation training of a patient who has lost motor functions. The subject must perform motor imagery tasks that will be transmitted to a computer application. The Brain – Computer Interface concept represents an abstraction for a direct communication between the human brain and external devices using brain signals measured with electroencephalography (EEG) within our studies.

BCI and Brain Plasticity: A coincident activation of **pre-synaptic** and **post-synaptic** neurons reinforces synaptic strength, resulting in **increased** and more reliable **communication** between the activated neurons. Assuming that the **connection** between peripheral muscles and the sensorimotor cortex has been **disrupted** due to a sub-cortical stroke, a **coincident activation** of **sensory feedback loops** and **primary motor cortex** may **reinforce** previously dormant cortical **connections** and thus support functional recovery.

The Motor Imagery task → Imagination of Movements

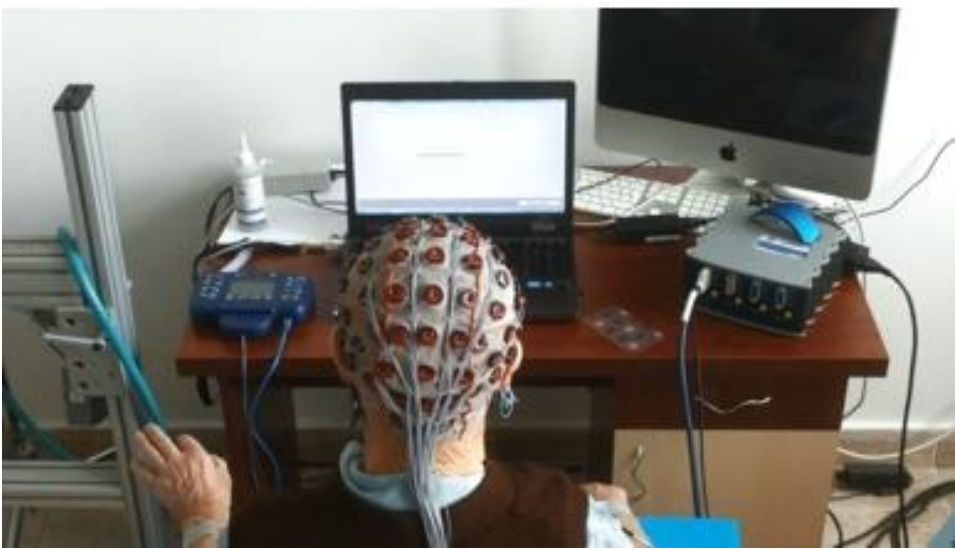
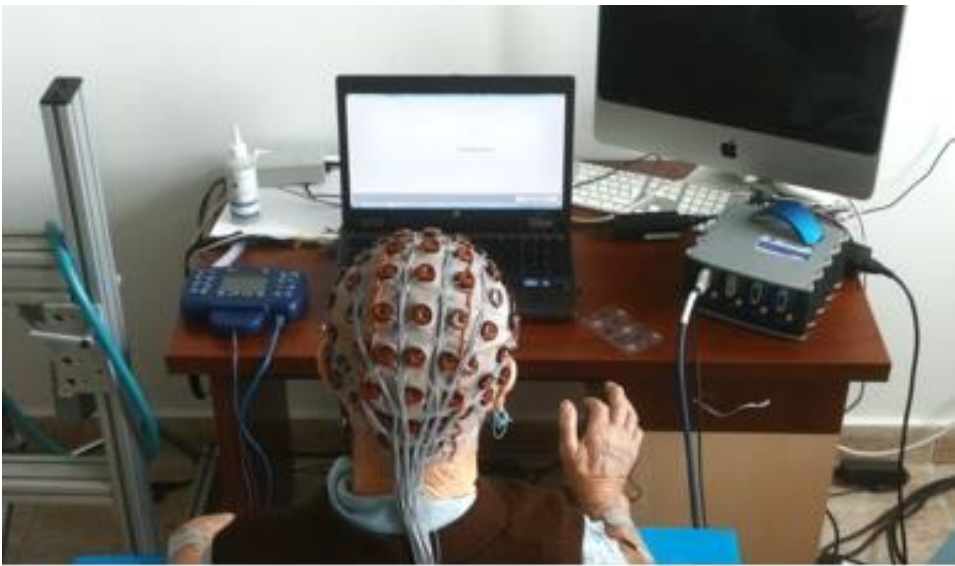
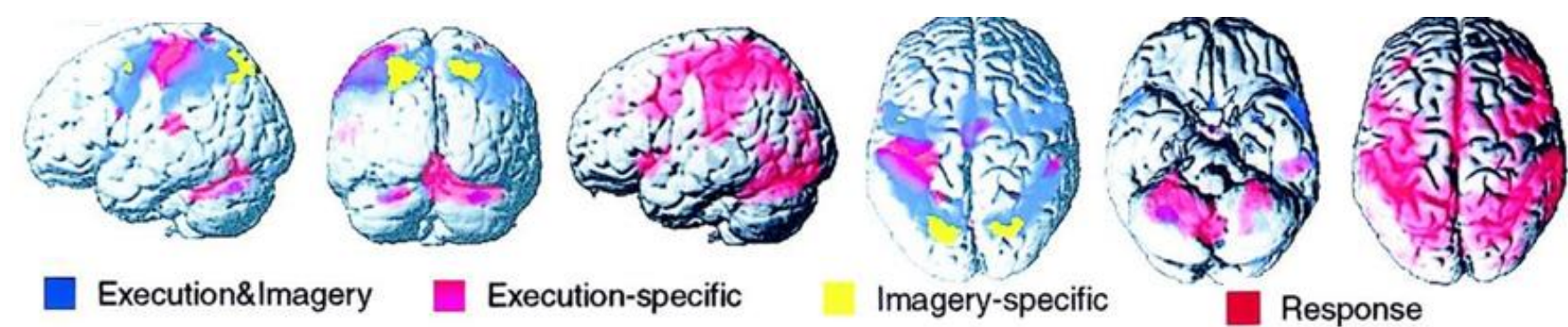


Fig.1. Imagining the movements. G.tec BCI System is used

The study of classification algorithms that can be optimal candidates for signals classification obtained in order to identify right and left hand movement:

Classifier	Class. Error (%)
Linear Discriminant Analysis	13
Minimum Distance Classifier (Euclid distance)	12
Support Vector Machine	18
Radial Basis Function	49
Multi-Layer Perceptron	8
Distinctive Sensitive Learning Vector Quantization	15

