ESHORIZONTE2020
Portal español del Programa Marco de Investigación e Innovación de la Unión Europea

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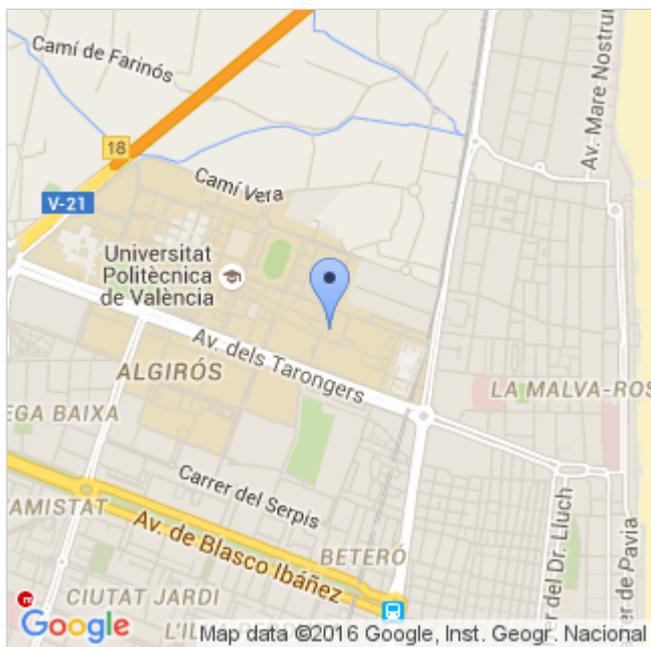
MINISTERIO
DE ECONOMIA
Y COMPETITIVIDAD

Expression of Interest

Contact Person/Scientist in Charge

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Universitat Politècnica de València (UPV)

Department / Institute / Centre

- **Name:** Departamento de Ingeniería Gráfica (Graphical Engineering Department) - Universitat Politècnica de València
- **Address:** Campus de Vera; Camino de Vera, s/n; Valencia (46022)
- **Province:** Valencia

Research Area

- Information Science and Engineering (ENG)
- Life Sciences (LIF)

Brief description of the institution:

Universitat Politècnica de València (UPV) is the single Spanish Technical University that features in the main University world rankings. It is within the top 5 Spanish Universities with the highest revenue from both public research and knowledge transfer activities, and a national leader in patent license income and start up creation. Constituted in 1971, it comprises nearly 30.000 students, over 2500 academics, and 17 university research centres of excellence.

UPV has a relevant experience in the participation in international research programmes, with over 100 FP7 projects and 40 H2020 projects in the period 2014-2015. UPV researchers are also actively involved all H2020 life program stages, from workprogramme drafting discussions, to project coordination. It is also taking part in several major partnering initiatives (JTIs, PPPs, KICs…).

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Brief description of the Centre/Research Group (including URL if applicable):

The main research lines of the group are: (1) Evaluation of brain activation by means of different neurophysiological signals and brain images from participants of virtual reality experiences. (2) Applications of new technologies and virtual reality combined with neurophysiological monitoring in mental health, for psychological treatments or promoting of well-being. (3) Modulation of brain activity (neurofeedback) to voluntarily control parameters related with pain perception in chronic pain patients.

The members of the group have great expertise in multidisciplinary research projects. They have participated in more than 30 research projects, currently funded by national and European Institutions. It has to be highlighted the participation of the scientist in charge in several european projects, including OPTIMI (248544) and Neuromed (245807).

Our group can offer expertise in the analysis of different kinds of neurophysiological signals: (1) Blood flow velocity signals obtained by TCD (Alcañiz et al., 2009; Rey et al., 2010a; Rey et al., 2011). (2) Brain activation images obtained by fMRI (Clemente et al., 2014a). (3) EEG signals (Clemente et al., 2014b; Rodríguez et al., 2015; Wrzesien et al., 2015).

On the other hand, our group can provide solutions based on new technologies and virtual reality combined with neurophysiological monitoring. These solutions can be applied in the field of mental health but also adapted to other fields, such as health care or neurological rehabilitation. http://personales.upv.es/beareyso

Project description:

<u>Modulation of brain activity (neurofeedback) to voluntarily control parameters related with pain perception in chronic pain patients</u>

Transcranial Doppler (TCD) monitoring is a tool that has recently been proposed to evaluate the dynamics of brain activation associated to painful stimuli (Duschek et al., 2012).This tool is a non–invasive diagnosis technique based on Ultrasound Doppler which is applied to analyze the hemodynamical variations in the brain by measuring blood flow velocities (BFV) in main cerebral vessels. One of the techniques that can be applied to modulate brain activations is neurofeedback, a type of biofeedback that measures brain waves or brain blood flow to produce a signal that can be used as feedback on brain activity to teach self-regulation. TCD has also been proposed recently for neurofeedback purposes (Duschek et al., 2011) .

During the project, the possibilities of TCD in the field of pain perception will be evaluated.

The specific goals of this research are the following: (1) Apply neurofeedback tools based on TCD to chronic pain patients. (2) Evaluate the best feature selection and classification techniques that can be used in neurofeedback systems. (3) Verify if the application of neurofeedback tools based on TCD generates

measurable differences in the sensory and affective components of pain in chronic pain patients. (4) Study the results obtained with different kinds of TCD based neurofeedback. (5) Propose a methodology for applying TCD based neurofeedback for the volitional control of brain activity on pain perception.

Applications

CV and letter of motivation. These documents should include the education degree of the candidate, temporal availability, previous experience in data analysis and biomedical signal processing or brain image analysis, previous experience working in interdisciplinary teams, and the specific research areas in which he or she would be interested.