Call name	Ph.D. IKUR position - Developing advanced representational learning models with applications in human cognitive neuroscience and brain computer interfaces
Application Deadline	2023/03/25

Introduction and main description

This project is led in collaboration between researchers of the Intelligent Systems Group (ISG) of the University of the Basque Country (UPV/EHU) and the Basque Center on Cognition, Brain and Language (BCBL) in San Sebastian, Spain. We are looking for a motivated student to fill a three-year PRE-DOCTORAL position in the scope of the IKUR project: "Developing advanced representational learning models with applications in human cognitive neuroscience and brain computer interfaces".

In AI, *representation learning* refers to methods able to automatically learn from data a concise, informative and effective feature representation for a given task. The emergence of highly-structured and multi-modal types of data requires the development of new AI methods able to deal with the different factors in this type of data (e.g., large scale, high-dimensionality, stochasticity) and with the complexity of the machine learning (ML) tasks involved (e.g., object and scene recognition, –language translation, automatic software validation, etc.). One of the areas where representation learning is crucial is Neuroscience. Automatically learning lower-dimensional neural representations from brain data (e.g., MEG, EEG, fMRI) is a standard strategy to test hypotheses about brain processes and human behaviour.

The main research objective will be to develop state of the art ML methods for learning low-dimensional representations that account for significant variance in the patterns of brain activity linked to human visual cognition and behavioural performance. Importantly, the goal is to develop representational learning models that support interpretability and uncertainty assessment of the input (e.g., noisy versus clean inputs at different levels of complexity), the model output (e.g., confidence in the prediction), and the representation itself (e.g., when contradictory evidence is input to a multi-modal model).

Skills and Requirements

Bachelor or Master degree in Physics, Computer Science, Mathematics or related areas.
Interest in the area of Neuroscience and signal analysis.
Strong background in computer programming, with knowledge of the Python language.
A team player who can collaborate with other research groups and research lines.

Work Program / Duties / Responsibilities

The main goal of the Ph.D. is the development of machine learning algorithms for learning representations that explain human behavior and brain activity during task performance. The Ph.D. student will be responsible for the processing and –analysis of the brain data, the development and evaluation of models to represent different characteristics of the data, writing scientific papers presenting the results and presenting his/her work in seminars and scientific conferences.

Application Procedure

Applicants should submit their Curriculum Vitae (CV), a motivation letter and arrange for two letters of reference to be sent on their behalf.

All files required for the application should be sent in PDF format to the following email addresses: d.soto@bcbl.eu and roberto.santana@ehu.eus, with the subject line "Application – IKUR Ph.D. Fellowship EHU-BCBL". The signed letters of reference must be sent by each referee in PDF form to the same email address; please ask him/her to include the text "Name of the candidate – Letter of Reference" in the subject line of the e-mail.

Other Relevant Information

Interviews will be conducted beginning of April. The successful candidate is expected to join the position by June 30th, at the latest.