

JOB OFFER

Software engineer R&D

Design and optimization of brain-computer interfaces (BCIs) for clinical applications

Keywords:

Software programming, Code optimization, Real-time, Data visualization and analysis, Signal processing

Context

Brain-computer interfaces (BCIs) constitute a promising tool for translating brain activity into commands to external devices. BCIs rely on the use of classification methods to discriminate the subject's mental state allowing to interact with external world bypassing muscles (sites.google.com/site/devicofallanifabrizio/outreach-1). Typical clinical applications are nonverbal communication, prosthesis control, and neurofeedback-based motor rehabilitation.

Aim

Despite the potential, BCIs outside the laboratory are difficult to use, which reduces their social and clinical impact. One of the main limitations is the high intra/inter-subject variability in terms of BCI performance, as measured by the classification accuracy.

The main aim of the project is to improve BCI performance by integrating new methods and algorithms developed by the team (sites.google.com/site/devicofallanifabrizio/Publications) into the Inria OpenVibe software (openvibe.inria.fr/).

Main activities

- Implement new algorithms/methods developed by the team
- Optimize the code to ensure real-time processing and fluid interaction
- Design intuitive data visualization of brain activity
- Handle possible I/O control of external devices (e.g. robotic arm)
- Test the robustness and adaptability to individual users
- Validate with real data involving healthy and paralyzed subjects
- Write technical and scientific documentation

Work environment

The ARAMIS team is dedicated to the development of new computational approaches for the analysis of neuroimaging and clinical data. The team (www.aramislab.fr) is located at the Brain and Spine Institute (<http://www.icm-institute.org>), one of the world top research institutes for neurosciences. The institute is ideally located at the heart of the Pitié-Salpêtrière hospital, downtown Paris.

The team is a young, multidisciplinary and vibrant environment consisting of master/PhD students, engineers, postdocs, research scientists and neurologists medical doctors. All scientific aspects of the team's research are synergistically presented and discussed to improve the overall impact. Furthermore, the team has facilitated access to neuroimaging and computing core-facilities and coordinates the BCI platform where experiments take place.

Required skills

- Experience > 3 years
- Computer science, Software engineering or related field
- Strong programming skills in C++, Java, Python/Matlab, GDK/GTK library
- Experience in software development under Windows and Linux environments
- Knowledge of the following software is appreciated: OpenViBE, BCI2000
- Knowledge of signal processing and human-computer interaction is a plus but not mandatory
- Good relational and communication skills for a multidisciplinary team working
- Very good level in written and spoken English. French is welcome but not compulsory.

Contacts

Send your CV and motivation letter to:

- fabrizio.devicofallani@gmail.com
- marieconstance.corsi@icm-institute.org

Apply here:

- jobs.inria.fr/public/classic/fr/offres/2019-01883

Contract details

- Duration: 24 months
- Location: Aramis lab, Brain and Spine Institute, Paris, France
- Salary: According to experience
- More details: jobs.inria.fr/public/classic/fr/offres/2019-01883