2018-00270 - Improving open libraries for brain imaging data analysis (H/F)

Contract type : Public service fixed-term contract
Level of qualifications required : Graduate degree or equivalent
Function : Temporary scientific engineer
Level of experience : Recently graduated

About the research centre or Inria department

Located at the heart of the main national research and higher education cluster, member of the Université Paris Saclay, a major actor in the French Investments for the Future Programme (Idex, LabEx, IRT, Equipex) and partner of the main establishments present on the plateau, the centre is particularly active in three major areas: data and knowledge; safety, security and reliability; modelling, simulation and optimisation (with priority given to energy).

The 450 researchers and engineers from Inria and its partners who work in the research centre's 31 teams, the 100 research support staff members, the high-level equipment at their disposal (image walls, high-performance computing clusters, sensor networks), and the privileged relationships with prestigious industrial partners, all make Inria Saclay Île-de-France a key research centre in the local landscape and one that is oriented towards Europe and the world.

Assignment

We are looking for a programmer to join our research group, Parietal team, at INRIA, to work on Nilearn a library applying advanced machine learning and signal processing to functional brain imaging.

As a programmer, you will be developing tools for the analysis of cognitive neuroscience and “functional connectivity” -- brain connectivity inferred using functional MRI. Large databases have been made available with these types of data and require powerful data analysis software.

The project unites neuroscientists, data-miners, statisticians and clinical researchers to transfer recent advances in basic neuroscience to clinical diagnostic tools. Your duties will be to work hand in hand with the computer science and statistics researchers to turn the research code into a solid and well documented Python library usable by clinical researchers. In particular, to make the core data-processing routines more usable, the project will develop specific data visualization. The technologies used will rely on the scientific Python stack and scikit-learn machine learning library.

Main activities

- Integration of the Nistats library into Nilearn, in order to simplify the long term maintenance of these libraries and have a more consistent framework for users.
- Improve Nilearn API with the introduction of more high-level objects for the sake of supervised analysis (decoder object) and the estimation of patterns from the data (clustering object)
- Integration of the NIDS and NIDM standards into Nilearn: these will make data analysis easier by automatically obtaining information on the data organization on the file system (BIDS) and outputting artifacts compatible with other tools (NIDM).
- Finally, we wish to introduce advances tools developed by Parietal, e.g. efficient multivariate estimators, for which we already have academic results and code, but the integration (uniform API, cleaning and documentation) still has to be done.

Skills

- love high-quality code and open source
- worry about users and like to communicate
- be curious about data (ie like looking at data and understanding it)
- have an affinity for problem-solving tradeoffs
- good scientific Python coders
- enjoy interacting with a community of developers
- interest in brain imaging and its applications.

General Information

- Theme/Domain : Computational Neuroscience and Medicine
  Software engineering (BAP E)
- Town/city : PALAISEAU
- Inria Center : CRI Saclay - Île-de-France
- Starting date : 4/1/18
- Duration of contract : 2 years
- Deadline to apply : 2/26/18

Contacts

- Inria Team : PARIETAL
- Recruiter : Thirion Bertrand / bertrand.thirion@inria.fr

Conditions for application

Defence Security : This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST). Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.

Recruitment Policy : As part of its diversity policy, all Inria positions are accessible to people with disabilities.

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.
Benefits package

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

Remuneration

Monthly gross salary: 2 632€ to 2 936€