Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Main activities

During the project, the candidate will be in charge of:

- Mastering the federated learning tools and related methodology
- Contacting and interacting with the clinical partners to identify the optimal solution for remote data access and management
- Development of proof-of-concept methods based on locally available datasets
- Mastering advanced machine learning tools for the analysis of medical data
- Deploying Fed-BioMed software in the hospitals network
- Technical testing of the federated architecture
- Executing of federated learning and validation of the model on external data
- Writing and publishing scientific work
- Writing and publishing documentation and open-source software in Fed-BioMed

Skills

Demonstrable experience in some of the following topics (the more the better):

- Statistics, Bayesian Modeling
- Natural Language Processing
- Optimization, Distributed Computing
- Python and PyTorch/TensorFlow
- Biomedical Data Analysis
- Signal Processing

About the research centre or Inria department

The Inria Sophia Antipolis - Méditerranée center counts 34 research teams as well as 7 support departments. The center's staff (about 500 people including 320 Inria employees) is made up of scientists of different nationalities (250 foreigners of 50 nationalities), engineers, technicians and administrative staff. 1/3 of the staff are civil servants, the others are contractual agents. The majority of the research teams are located in Sophia Antipolis and Nice in the Alpes-Maritimes. Four teams are based in Montpellier and two teams are hosted in Bologna in Italy and Athens. The Center is a founding member of Université Côte d'Azur and partner of the I-site MUSE supported by the University of Montpellier.

Context

The project FLH is a collaboration between the EPIONE group of Inria Sophia Antipolis and the startup MyDataModels (MDM).

In this project, we focus on the use of federated learning for the analysis of healthcare data issued from a network of hospitals and clinical collaborators. The project is based on the development of unsupervised learning tools for the analysis of data from consultation software in general medicine.

Specific scientific and technological challenges of the project are:

- Design of learning methods for the analysis of highly heterogeneous data, either quantitative and structured (clinical/biological examinations), or unstructured (reports).
- This challenge requires the investigation of new tools for the joint analysis of complex data, based on dimensionality reduction approaches, with the analysis of language data (natural language processing - NLP).
- Technological development to adapt the Fed-BioMed software (https://fedbiomed.gitlabpages.inria.fr/). In particular, the software must take into account the non-interoperability of the systems, and the heterogeneous nature of the data format in each establishment.

Assignment

The project requires to acquire a solid understanding of the medical data and use-cases provided by the clinical partners, and to develop appropriate machine learning/statistical methods for tackling the analysis problem.

The candidate is expected to implement and deploy the model within the Fed-BioMed federated learning frameworks, to collaborate with the dev team, and contribute to the software development.

The project requires communication and interaction with research, industrial, and clinical personnel.

The keys to success

Strong ability to work in a multidisciplinary environment is necessary, as well as communication skills and motivation in taking responsibilities (e.g. supervision, organization of scientific events).

Instruction to apply

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.
Remuneration
Gross Salary: 2653 € per month