



Offre n°2024-07159

Engineer - Scientific programmer in privacy-preserving federate learning with applications in oncology

Type de contrat : Fixed-term contract

Niveau de diplôme exigé : Graduate degree or equivalent

Fonction : Temporary scientific engineer

Niveau d'expérience souhaité : Up to 3 years

A propos du centre ou de la direction fonctionnelle

The Inria University of Lille centre, created in 2008, employs 360 people including 305 scientists in 15 research teams. Recognised for its strong involvement in the socio-economic development of the Hauts-De-France region, the Inria University of Lille centre pursues a close relationship with large companies and SMEs. By promoting synergies between researchers and industrialists, Inria participates in the transfer of skills and expertise in digital technologies and provides access to the best European and international research for the benefit of innovation and companies, particularly in the region. For more than 10 years, the Inria University of Lille centre has been located at the heart of Lille's university and scientific ecosystem, as well as at the heart of Frenchtech, with a technology showroom based on Avenue de Bretagne in Lille, on the EuraTechnologies site of economic excellence dedicated to information and communication technologies (ICT).

Contexte et atouts du poste

This engineer position will be supported by the [HE Trumpet project](#), the [HE Flute project](#) and/or the [PEPR IA Redeem](#) project. While this position will be in the

MAGNET team in Lille, we will collaborate with the several European project partners.

While AI techniques are becoming ever more powerful, there is a growing concern about potential risks and abuses. As a result, there has been an increasing interest in research directions such as privacy-preserving machine learning, explainable machine learning, fairness and data protection legislation.

Privacy-preserving machine learning aims at learning (and publishing or applying) a model from data while the data is not revealed. Notions such as (local) differential privacy and its generalizations allow to bound the amount of information revealed.

The MAGNET team is involved in the related TRUMPET, FLUTE and REDEEM projects, and is looking for team members who can in close collaboration with other team members and national & international partners contribute to one or more of these projects. All of these projects aim at researching and prototyping algorithms for secure, privacy-preserving federated learning in settings with potentially malicious participants. The TRUMPET and FLUTE projects focus on applications in the field of oncology, while the REDEEM project has no a priori fixed application domain.

Mission confiée

The recruited engineer will collaborate with colleagues in the MAGNET team and the TRUMPET/FLUTE/REDEEM projects' consortia. In particular, the work will contribute to TRUMPET/FLUTE's platform and REDEEM's open source library, by collaboratively designing and developing the overall architecture and contributing modules providing privacy enhancing technologies (PETs) and privacy assessment functionality based on MAGNET scientific advances

By default all developed software will be open-source.

Tasks may include

- developing algorithms, e.g., cryptographic or statistical modules, modules supporting the knowledge discovery pipeline and its automatisation
- testing algorithms through systematic benchmarking / experimentation
- applying algorithms in medical applications, e.g., TRUMPET's lung cancer or head&neck cancer or FLUTE's prostate cancer use cases.

Principales activités

- Studying new algorithms for reasoning about data privacy

- Automatically analyzing and transforming algorithms and queries provided as input.
- Design and prototyping of key algorithms
- Create appropriate documentation
- Integrate such implementations in the FLUTE platform
- test algorithms and run experiments

Compétences

Technical skills and level required :

- a strong understanding of distributed algorithms
- software design and development skills (relevant code may include Python and/or C/C++)
- understanding of process models and (probabilistic) reasoning techniques
- understanding of programming language internals (e.g., abstract syntax trees)

Languages :

- Mastering English is essential

Relational skills :

- smoothly working in a team in a research environment
- effective communication and collaboration

Avantages

- 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

Rémunération

According to the profile

Informations générales

- **Thème/Domaine** : Data and Knowledge Representation and Processing Software Experimental platforms (BAP E)
- **Ville** : Villeneuve d'Ascq
- **Centre Inria** : [Centre Inria de l'Université de Lille](#)
- **Date de prise de fonction souhaitée** : 2025-07-01
- **Durée de contrat** : 2 years
- **Date limite pour postuler** : 2025-06-30

Contacts

- **Équipe Inria** : [MAGNET](#)
- **Recruteur** :
Ramon Jan / jan.ramon@inria.fr

A propos d'Inria

Inria est l'institut national de recherche dédié aux sciences et technologies du numérique. Il emploie 2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l'interface d'autres disciplines. L'institut fait appel à de nombreux talents dans plus d'une quarantaine de métiers différents. 900 personnels d'appui à la recherche et à l'innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

We are looking for a candidate with a strong background in computer science, with interest in research (including the mathematics needed to realize privacy) who welcomes the broad range of challenges leading to a successful result.

The development to which the engineers will contribute will include among others parts requiring (a) highly efficient mathematical code (for the reasoning components), (b) communication and security related modules, (c) interaction with AI libraries (e.g., scikit learn) and (d) analyzing and transforming algorithms and queries provided as input by the ML user. Being familiar with at least one of these

areas of software development is an important asset.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

CV + application letter + recommendation letters + List of publications

Academic transcripts, project report

Sécurité défense :

Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.

Politique de recrutement :

Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.