Offre n°2025-09177

Post-Doctorant F/H Differential Privacy and Fairness-Aware AI

Type de contrat : CDD

Niveau de diplôme exigé : Thèse ou équivalent

Fonction : Post-Doctorant

A propos du centre ou de la direction fonctionnelle

The Inria Grenoble research center groups together almost 600 people in 27 research teams and 8 research support departments.

Staff is present on three campuses in Grenoble, in close collaboration with other research and higher education institutions (University Grenoble Alpes, CNRS, CEA, INRAE, …), but also with key economic players in the area.

Inria Grenoble is active in the fields of high-performance computing, verification and embedded systems, modeling of the environment at multiple levels, and data science and artificial intelligence. The center is a top-level scientific institute with an extensive network of international collaborations in Europe and the rest of the world.

Contexte et atouts du poste

Context. This postdoctoral position is part of the ANR JCJC project AI-PULSE (Aligning Privacy, Utility, and Fairness for Responsible AI), led by Héber H. Arcolezi within the Privatics team at Inria Grenoble.
AI-PULSE addresses a key open question in responsible AI: can we design practical machine learning systems that satisfy strong privacy guarantees [1] and fairness [2] constraints simultaneously, without sacrificing utility?

The postdoctoral researcher will play a central role in the project's core scientific tasks. The work will build on preliminary findings that local differential privacy (LDP) can help decrease biases [3, 4] instead of always worsening them, a challenging conventional assumption in the field [5].
The position will be embedded in a network of national and international collaborations, especially with ÉTS Montréal and UQAM, and includes opportunities for short- and medium-term research visits, collaborative development, and joint publications.

We are looking for a candidate who can bring new expertise to the team and/or help strengthen collaborations within the project consortium. The postdoc will work closely with project members to deliver high-impact theoretical and practical contributions to responsible AI.

Starting Date. Flexible start in late 2025 or early 2026.

Selected references.

- [1] Dwork, Cynthia, and Aaron Roth. "The algorithmic foundations of differential privacy." Foundations and Trends® in Theoretical Computer Science 9.3–4 (2014): 211-407.
- [2] Barocas, Solon, Moritz Hardt, and Arvind Narayanan. Fairness and machine learning: Limitations and opportunities. MIT press, 2023.
- [3] Makhlouf, Karima, et al. "A systematic and formal study of the impact of local differential privacy on fairness: Preliminary results." 2024 IEEE 37th computer security foundations symposium (CSF). IEEE, 2024.
- [4] Makhlouf, Karima, et al. "On the impact of multi-dimensional local differential privacy on fairness." Data Mining and Knowledge Discovery 38.4 (2024): 2252-2275.
- [5] Bagdasaryan, Eugene, Omid Poursaeed, and Vitaly Shmatikov. "Differential privacy has disparate impact on model accuracy." NeurIPS 2019.

Mission confiée

Assignment. The recruited postdoc will collaborate with the project team to:
- Develop and rigorously evaluate new methodological frameworks that combine differential privacy and fairness-aware learning for real-world ML applications.
- Explore decentralized learning scenarios, including federated learning, to address privacy and fairness simultaneously when data must remain local.
- Theorize and quantify privacy–fairness–utility trade-offs under local privacy constraints, and contribute new LDP mechanisms that satisfy fairness guarantees.
- Translate research outputs into open-source building blocks, contributing to a broader DP-Fairness Toolkit for the research and practitioner community.

Research Topics. Possible directions include (but are not limited to):
- Design of new locally private mechanisms for high-dimensional or structured data that account for fairness constraints.
- Theoretical and empirical analysis of fairness mitigation steps in decentralized learning pipelines.
- Development of scalable prototypes and benchmarks for practical deployment in privacy-sensitive settings.

These outcomes will directly support the milestones of AI-PULSE and contribute broadly to the responsible AI research landscape.

Principales activités

Main activities.
- Design and analyze new locally private and fairness-aware ML algorithms.
- Collaborate with Privatics members, and contribute to research visits to

international partners.
- Prototype methods and contribute to open-source code repositories.
- Publish and present results at top-tier international conferences.

Compétences

Profile. We are looking for a candidate with:
- PhD in Computer Science, Statistics, or related fields.
- Strong background in one or more of the following: differential privacy, algorithmic fairness, or federated learning.
- Strong Python development skills; experience with open-source projects is valued.
- Strong analytical, communication, and collaboration skills.
- Proficiency in English.

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 (90 days / year) 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
- Complementary health insurance under conditions

Rémunération

2788€ gross salary / month

Informations générales

- **Thème/Domaine :** Sécurité et confidentialité
  Statistiques (Big data) (BAP E)
- **Ville :** Montbonnot
- **Centre Inria :** Centre Inria de l'Université Grenoble Alpes
- **Date de prise de fonction souhaitée :** 2025-11-01
- **Durée de contrat :** 2 ans
- **Date limite pour postuler :** 2025-08-31

Contacts

- **Équipe Inria :** PRIVATICS

- **Recruteur :**
  Hwang Arcolezi Heber / heber.hwang-arcolezi@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'e?orce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

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

Applications must be submitted online on the Inria website.

Processing of applications sent by other channels is not guaranteed.

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.