

2022-05156 - Engineer - F/M Fair and Optimal Design of (Repeated) MarketPlace

Type de contrat : CDD

Niveau de diplôme exigé : Thèse ou équivalent

Fonction : Ingénieur scientifique contractuel

Niveau d'expérience souhaité : Jeune diplômé

A propos du centre ou de la direction fonctionnelle

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 28 teams, the 60 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.

Contexte et atouts du poste

The Engineer will be hired by Inria and integrate the EEL team of Criteo. (S)he will join the FairPlay team, a new team jointly created by Criteo, Institut Polytechnique de Paris (ENSEA and Ecole Polytechnique), and Inria. As such the post-doc will spend time both in Criteo and in CREST in Saclay where the team is hosted. The engineer will have access to Criteo data on-site whenever useful to test algorithms on real data.

Mission confiée

Context:

Online ads platforms are nowadays used to advertise not just products, but also opportunities such as jobs, houses, or financial services. This makes it crucial for such platforms to respect fairness criteria (be it only for legal reasons). Despite this pressing need, there is currently no technical solution in place to provably prevent discriminations. One of the main challenge is that ad impression decisions governed by complex marketplaces with multiple agents that involve asymmetry and asynchronicity of decisions, which are not currently well understood in particular in the repeated setting (which happens in practice). To better understand these marketplaces and develop fair and efficient algorithms, it is necessary to propose and analyze new theoretical models and algorithms.

Objectives:

The main objective of the post-doc is to develop new theoretical models and algorithms with theoretical guarantees for ad marketplaces that respect fairness notions; and to test them. The first goal is theoretical and is divided in two main axes:

- Development of matching algorithms for marketplaces that respect fairness constraints, potentially on both sides (buyers and sellers). One of the key difficulty is that this objective is in contradiction with privacy considerations since measuring fairness requires access to sensitive attributes.
- Incorporating random structures, in particular random graphs, in the design and optimization of algorithms. Indeed, current learning algorithms focus typically today on worst-case guarantee that lead to poor performance in many practical cases which are not worst case.

The last goal, depending on the progress of the theoretical goal above, will be to construct a simulator of marketplace that would make sellers and buyers interact under the umbrella of the marketplace. By modeling the agents behaviors (e.g., through reinforcement learning algorithms), it would then become possible to evaluate the impact of changes in the marketplace on the market and eventually to perform empirical design of mechanisms for such complex marketplaces.

Collaborations:

The post-doc will work with Vianney Perchet from Criteo/ENSEA and Patrick LOISEAU from Inria, but collaboration with other members of the FairPlay team is welcome.

Principales activités

Main activities: Understanding the state-of-the-art, developing novel algorithms and proving theoretical guarantees, developing and testing the solutions, communicating the work (papers, talks, etc.)

Compétences

Technical skills and level required: PhD level in the fields mentioned above fields

Languages: English mandatory, French is not mandatory

Relational skills: Taste for collaborative research

Other valued appreciated: Interest in theory and applications to online marketplaces

Informations générales

- **Thème/Domaine** : Optimisation, apprentissage et méthodes statistiques Statistiques (Big data) (BAP E)
- **Ville** : Palaiseau
- **Centre Inria** : CRI Saclay - Île-de-France
- **Date de prise de fonction souhaitée** : 2022-10-01
- **Durée de contrat** : 1 an, 11 mois
- **Date limite pour postuler** : 2022-09-02

Contacts

- **Equipe Inria** : FAIRPLAY
- **Recruteur** :
Loiseau Patrick / patrick.loiseau@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 200 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3500 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 180 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

The candidate should have a PhD in mathematics, computer science, economics, or a related field. (S)he should have a strong background in mathematics (probability in particular) and in either online learning or game theory, and be interested in marketplaces as well as in societal aspects. Programming capabilities will also be appreciated.

Consignes pour postuler

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.

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.

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 (after 6 months of employment) 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

Monthly salary : 2.653 euros