Offre n°2024-07130

Post-Doctoral Research Visit F/M Risk Measures in Task-Oriented Communications

Le descriptif de l'offre ci-dessous est en Anglais

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 research centre in Lyon is the 9th Inria research centre, formally created in January 2022. It brings together approximately 300 people in 16 research teams and research support services.

Its staff are distributed at this stage on 2 campuses: in Villeurbanne La Doua (Centre / INSA Lyon / UCBL) on the one hand, and Lyon Gerland (ENS de Lyon) on the other.

The Lyon centre is active in the fields of software, distributed and high-performance computing, embedded systems, quantum computing and privacy in the digital world, but also in digital health and computational biology.

Contexte et atouts du poste

This postdoctoral research position will be carried out in Inria Lyon, funded by the PEPR Networks of the Future programme. The candidate will be hosted within the MARACAS team in the CITI Laboratory, working primarily with Dr. Malcolm Egan. As the PEPR Networks of the Future programme is a national French collaboration, opportunities will be available for interactions with other researchers working in foundations and applications via seminars, workshops, and short-term visits.

Mission confiée

The focus of the PEPR Networks of the Future programme is to develop fundamental and applied research towards future communication networks. One aspect of this programme is goal-oriented and semantic communications, where communications is tailored for a specific task (e.g., training machine learning models or process control). In addition to considering task-dependent constraints (e.g., latency or reliability), a key aspect of goal-oriented communications is selecting relevant data to communicate.

In the work to be carried out in this postdoctoral position, the focus is on coding schemes (both compression and channel) with guarantees on the performance of a specific task. In particular, unlike for traditional coding schemes, we will focus on risk constraints, which account for the impact of a large distortion in the received signal on the performance of a task. Our focus will be on tasks modeled via data-dependent optimization, which arises in machine learning, statistical inference, and resource allocation.

The goal of this postdoctoral position will be to design and analyze coding schemes using tools from information theory subject to risk constraints where the distortion measure is defined in terms of optimality loss in data-dependent optimization. The performance of algorithms to construct (joint) source and channel codes will be then evaluated in comparison with the theoretical analysis.

Principales activités

The candidate will carry out research on federated learning algorithms in collaboration with members of the MARACAS Inria project-team. This includes participation in local seminars as well as in summer schools and international conferences.

Main activities:

- Information-theoretic analysis of risk-constrained source and channel coding.
- Development of algorithms to construct source and channel codes with risk-constraints.
- Simulation-based comparisons of information-theoretic bounds and proposed algorithms.

Compétences

Technical skills and level required :

Languages :

Relational skills :

Other valued appreciated :

Avantages

- Subsidized meal
- 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 :** Réseaux et télécommunications
- **Ville :** Villeurbanne
- **Centre Inria :** Centre Inria de Lyon
- **Date de prise de fonction souhaitée :**2024-09-01
- **Durée de contrat :**1 an, 6 mois
- **Date limite pour postuler :**2024-07-31

Contacts

- **Équipe Inria :** MARACAS
- **Recruteur :**
  Egan Malcolm / malcom.egan@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

There you can provide a "broad outline" of the collaborator you are looking for what you consider to be necessary and sufficient, and which may combine :

- tastes and appetencies,
- area of excellence,
- personality or character traits,
- cross-disciplinary knowledge and expertise...

This section enables the more formal list of skills to be completed and 'lightened' (reduced) :

- "Essential qualities in order to fulfil this assignment are feeling at ease in an environment of scientific dynamics and wanting to learn and listen."
- " Passionate about innovation, with expertise in Ruby on Rails development and strong influencing skills. A thesis in the field of **** is a real 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

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.