
Type de contrat : CDD de la fonction publique  
Niveau de diplôme exigé : Bac + 5 ou équivalent  
Fonction : Post-Doctorant

A propos du centre ou de la direction fonctionnelle
Grenoble Rhône-Alpes Research Center groups together a few less than 800 people in 35 research teams and 9 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

Contexte et atouts du poste
This postdoctoral position is opened within the collaboration between INRIA and the University of Sheffield (TUOS) in the areas of Information Sciences and Systems. The position is fully funded by INRIA and hosted in France by the Laboratoire CITI in the scientific campus of Lyon. Mobility between the Laboratoire CITI and the Department of Automatic Control and Systems Engineering of The University of Sheffield is expected.

The position is supervised by Prof. Ifaki Esnasa (Sheffield) and Prof. Samir M. Perlaza (INRIA). The research topic lies in the broad intersection of information theory, game theory, and artificial intelligence. The starting date is September 2019.

Mission confiée
Most daily-life activities for both humans and machines rely on a simple yet central set of capabilities inherent to humans that have only recently been granted to machines: (a) data acquisition about their environment and context; (b) information processing to parse and analyze the acquired data; and (c) decision making to optimize the interaction with the environment, other machines, and humans. The convergence of information, decision making, and the complex environment gives rise to complex dynamics both at the system level and at the information flow level.

The data acquisition as well as information processing are studied by mathematicians and engineers within the framework of information theory and data sciences. On the other hand, decision-making processes are studied within the foundations of game theory and control theory. Surprisingly, there is little progress towards a unified mathematical theory integrating the advances in information theory, data sciences, game theory and control theory. Most of the current literature is developed under the assumption that decision makers possess complete information in order to make decisions and interact with each other. The most comprehensive developments suggest Bayesian approaches to model the lack of information via priors. However, within the current Bayesian approach, the impact of mismatched or imperfect knowledge about the priors is difficult to assess in a quantitative fashion. More importantly, the effect of partial knowledge about the priors on the dynamics induced by the decision making processes is not understood yet.

Principales activités
The main objective is to bring together the tools and methodologies in the fields of information theory, data sciences, game theory and control theory to study the impact of information on decision making processes arising from the interaction among humans, machines or humans and machines. The distinction between the available data and the information that is available will be posed on an information-theoretic framework. Thus, the data acquisition capabilities within the system translates into the prediction of information sets that are available to the agents in their decision making process. Ultimately, this project aims to provide a unifying framework to characterize the interplay between data acquisition, available information, and the decision making.

Human decision making is too ramified to be amenable to an exact mathematical treatment. Indeed, recent advancements on machine learning highlight that while extraordinary performance has been achieved on several application domains, there is still a lack of explanatory and fundamental principles for hallmark machine learning techniques such as deep learning. In the case of human the distinction between the available data and the available information in a decision making process is illuminating. Two humans provided with the same data might implement different information processing mechanisms and as a result make different choices due to the differences in their information sets. Similarly, two machines, built for performing the same task, might decide completely different depending on the data they have been trained upon. At the core of this problem lies the difficulty of characterizing the amount of information and the value of that information in the decision making process. This project aims to address that shortcoming by developing an information-theoretic framework for this paradigm.

The main scientific challenge is to build tractable models that capture the main aspects of decision making with incomplete information. From this perspective, such a simplified model might not necessarily lead to full understanding of a particular situation. Nonetheless, it can lead to insights of a more general nature that might have an impact in policy making impacting a society or in the way artificially intelligent machines are conceived, designed and trained to interact among them.

Compétences
The ideal candidate possesses a Phd in applied mathematics with experience in data analytics, risk management or artificial intelligence.

Informations générales
- Thème/Domaine : Optimisation, apprentissage et méthodes statistiques
- Systèmes d’information (BAP E)
- Ville : Lyon
- Centre Inria : CRI Grenoble - Rhône-Alpes
- Date de prise de fonction souhaitée : 2019-10-01
- Durée de contrat : 1 an, 4 mois
- Date limite pour postuler : 2019-04-28

Contacts
- Equipe Inria : MARACAS
- Recruteur : Perlaza Samir / samir.perlaza@inria.fr

A propos d'Inria
Inria, l'institut national de recherche dédié aux sciences du numérique, promeut l'excellence scientifique et le transfert pour avoir le plus grand impact. Il emploie 2400 personnes. Ses 200 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3000 scientifiques pour relever les défis des sciences informatiques et mathématiques, souvent à l'interface d'autres disciplines. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 160 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.

Consignes pour postuler
Starting date: 1st October 2019, duration: 16 months.

Applicants should hold a PhD defended after 1st September 2017.

Applications have to be made on-line on the Inria web site before end of 28th April.

Sécurité défense :
Ce poste est susceptible d’être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-425 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
Gross salary: 2653 Euros per month.