Contexte et atouts du poste

MiMove’s research, in particular, accounts for the presence of large and volatile populations of mobile and resource-constrained devices, such as user handhelds and wireless sensors, as well as of fast evolving, global networking and computing infrastructures. We study systems that are dynamically composed from heterogeneous networked resources in the near (pervasive, edge, fog) and remote (Internet, cloud) environment, and that furthermore adapt to their highly changing execution context, whether technical, physical or social. The latter two aspects are particularly manifested through the physical but also social sensing and actuation capabilities of mobile devices and their users. More specifically, leveraging the massive adoption of smartphones and other user-controlled mobile devices, besides physical sensing - where a device’s sensor passively reports the sensed phenomena - social sensing and social crowd-sensing come into play, where the user is aware of and indeed aids in the sensing of the environment.

Mission confiée

The above challenging context raises key research questions:

- How to deal with heterogeneity and dynamicity, which create runtime uncertainty, when developing and running mobile systems in the open and constantly evolving Internet and IoT environment?
- How to enable automated diagnosis and optimization of networks and systems in the Internet and IoT environment for improving the QoE of their users?
- How to raise human centric crowd-sensing to a reliable means of sensing world phenomena?
- How to deal with combination, analysis and privacy aspects of Web/social media and IoT crowd-sensing data streams?

Principales activités

In response to the research questions identified above, the postdoc researcher is expected to contribute to MiMove’s research in one of the following topics:

- **Emergent mobile distributed systems**: We study techniques enabling emergence of mobile distributed systems in a beforehand unknown, ever-changing environment, while assuring that their required properties are met. These systems that, due to their automated, dynamic, environment-dependent composition and execution, emerge in a possibly non-anticipated way and manifest emergent properties, i.e., both systems and their properties take their complete form only at runtime and may evolve afterwards.
- **Large-scale mobile sensing and actuation systems**: MiMove investigates algorithms and protocols for efficient coordination of future mobile sensing and actuation systems, with a special focus on the quality of sensing. We deal with challenges arising from the extremely large scale, dynamically changing, and resource constraints of mobile devices, a large number of which can be attached to people, manifesting uncontrolled mobility behavior.
- **Mobile social crowd-sensing**: MiMove investigates the capabilities and challenges resulting from social sensing, which, by directly involving the users, enables sensing phenomena beyond the typical physical sensing (e.g., subjective crowdsensing causing discomfort or a traffic concert) and can lead to a feeling of being more socially involved for the citizens. We study solutions to the combination of physically and socially sensed data, incentivized user participation and assurance of user data privacy, as well as novel mobile apps enabling empirical studies of the complex social behaviors involved.
- **Active and passive probing methods**: We are developing methods that actively introduce probes in the network to discover properties of the connected devices and network segments. We are focusing in particular on adaptive methods to discover properties of home networks and to distinguish if performance bottlenecks lie within the home network versus outside. We are also developing passive methods that simply observe network traffic to infer the performance of networked applications and the location of performance bottlenecks.

Informations générales

- **Thème/Domaine**: Systèmes distribués et intergiciels
- **Système & réseau** (BAP E)
- **Ville**: Paris
- **Centre Inria**: CRI de Paris
- **Date de prise de fonction souhaitée**: 2019-11-01
- **Durée de contrat**: 1 an, 4 mois
- **Date limite pour postuler**: 2019-03-17

Contacts

- **Equipe Inria**: MiMOVE
- **Recruteur**: Georgantas Nikolaos / nikolaos.georgantas@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

**Candidate’s file**:
- Lettre de motivation highlighting the adequacy of the candidate’s training with the proposed subject.
- CV
- List of publications.
- Thesis reports if the thesis has already been defended.
- For candidates who have not yet defended, an attestation from the thesis director with a progress report on the thesis / composition of the jury and the probable date of defense.
- Letters of recommendation

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.

Polilitique 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
bottlenecks, as well as to extract patterns of web content consumption.

- **Inferring user online experience.** We are developing hybrid measurement methods that combine passive network measurement techniques to infer application performance with techniques from HCI to measure user perception. We will later use the resulting datasets to build models of user perception of network performance based only on data that we can obtain automatically from the user device or from user’s traffic observed in the network.

- **Real time data analytics.** Advanced analysis of real time data streams from sensors embedded in the environment and wearable or mobile user devices is becoming a key area of data mining research. However, the high data speed in conjunction with the low data quality of IoT data streams challenge traditional Machine-Learning (ML) approaches. We study the effect of the previous on ML algorithms and how to automate data pre-processing tasks (for controlling data quality).

### Compétences

The candidate should have a PhD in Computer Science with expertise - including experience in the implementation of related software prototypes - in one and possibly several of the following topics:

- Mobile distributed systems,
- Middleware architectures and protocols,
- Networks and network protocols,
- Network measurements,
- Software engineering,
- Wireless sensor networks,
- Data mining and analysis,
- Social networks.

### 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

### Rémunération

- Location: Paris 12ème
- Gross Salary per month: 2 653€ brut/mensuel

Security and defense procedure:

This position is likely to be situated in a restricted area (ZRR), as defined in Decree No. 2011-1425 relating to the protection of national scientific and technical potential (PPST).

Authorisation to enter an area is granted by the director of the unit, following a favourable Ministerial decision, as defined in the decree of 3 July 2012 relating to the PPST. An unfavourable Ministerial decision in respect of a position situated in a ZRR would result in the cancellation of the appointment.