Offre n°2025-09009

GPS-Free Mobility Analysis Platform for Low-Power Wireless Devices

Type de contrat : Fixed-term contract

Niveau de diplôme exigé : Graduate degree or equivalent

Fonction : Temporary scientific engineer

A propos du centre ou de la direction fonctionnelle

The Inria Saclay-Île-de-France Research Centre was established in 2008. It has developed as part of the Saclay site in partnership with **Paris-Saclay University** and with the **Institut Polytechnique de Paris** .

The centre has **40 project teams** , 32 of which operate jointly with Paris-Saclay University and the Institut Polytechnique de Paris; Its activities occupy over 600 people, scientists and research and innovation support staff, including 44 different nationalities.

Contexte et atouts du poste

Research on mobile systems focuses on collecting and analyzing spatiotemporal datasets, providing valuable insights into the mobility patterns of users and goods. However, gathering such data presents significant challenges, particularly in developing non-intrusive data acquisition strategies. These strategies must also consider the energy constraints of tracking devices, ensuring prolonged operation without compromising data quality or user experience.

Bluetooth Low Energy (BLE) emerges as a promising candidate technology for non-intrusive and energy-efficient data collection in mobile systems. BLE tag systems provide a cost-effective solution for localizing assets, including people and high-value goods. These systems determine presence by capturing BLE signals via a receiver that knows its own position, typically providing binary information, indicating whether an object is present or not in the vicinity. In this project, we aim to go beyond binary data by analyzing and interpreting signal measurements to reconstruct the mobility patterns of tagged objects. A key advantage of conducting a global analysis is the ability to correlate diverse events, such as tag detections and transport movements between facilities, allowing us to infer common behaviors and gain deeper insights into mobility patterns.

This project is a collaboration between Inria and La Poste, combining academic research expertise with real-world operational challenges. The partnership provides access to large-scale deployment environments and actual logistics warehouses, facilitating the development and validation of explored solutions.

Mission confiée

The mission is to set up an experimental platform to automate and manage all processes involved in the project, including:

- The capture and processing of BLE signals from tags in lab and real deployment scenarios,
- The interpretation of signal presence and absence over time and space to infer proximity events,
- And the integration of contextual data, such as known movement patterns or facility layouts, to refine contact detection and reduce false positives.

The mission is to establish an experimental platform for automating and managing all processes involved in the Mitik project. The main goal is to integrate all the stages that comprise the project's architecture more efficiently, with minimal error-prone processes, and automate time-consuming tasks. It includes infrastructure preparation, unifying code sources, ensuring compatibility between tools, and managing data, among others.

Principales activités

- Design, develop and deploy an experimental platform to integrate layers of Mitik project.
- Develop the tools necessary to plan, initiate, and manage experiments for implementing passive sniffers.
- Documentation writing
- Test and modify until validation.
- Good knowledge of Linux and scripting languages
- Programming languages: Python, C/C++, Bash
- Good technical English skills

Compétences

- A PhD or Master's in wireless networks, mobile networks, or data-related topics.
- A solid understanding of networking principles, protocols, and architectures is essential.
- The ability to write and debug (student) code in Python is an essential requirement.
- Proficiency in programming languages commonly used in AI and networking research.
- Experience with relevant libraries and frameworks is also valuable.
- Ability to design and implement algorithms for solving complex problems.
- Familiarity with optimization techniques.
- Excellent written and verbal communication skills for presenting research findings, writing academic papers, and collaborating with peers.
- Ability to work effectively as part of a research team, collaborate with colleagues from diverse backgrounds, and contribute positively to group dynamics

- This multi-disciplinary, multi-team project requires good personal and project management skills.
- Language: French/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 (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

Regarding professional experience.

Informations générales

- **Thème/Domaine :** Networks and Telecommunications
  System & Networks (BAP E)
- **Ville :** Palaiseau
- **Centre Inria :** Centre Inria de Saclay
- **Date de prise de fonction souhaitée :** 2025-11-01
- **Durée de contrat :** 1 year, 11 months
- **Date limite pour postuler :** 2025-09-30

Contacts

- **Équipe Inria :** TRIBE
- **Recruteur :**
  Achir Nadjib / Nadjib.Achir@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.

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

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.