Offer #2025-09009

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

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Fonction : Temporary scientific engineer

About the research centre or Inria department

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.

Context

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.

Assignment

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.

Main activities

- 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

Skills

- 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

Benefits package

- 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

Remuneration

Regarding professional experience.

General Information

- **Theme/Domain :** Networks and Telecommunications
  System & Networks (BAP E)

- **Town/city :** Palaiseau
- **Inria Center :** Centre Inria de Saclay
- **Starting date :** 2025-11-01
- **Duration of contract :** 1 year, 11 months
- **Deadline to apply :** 2025-09-30

Contacts

- **Inria Team :** TRIBE
- **Recruiter :**
  Achir Nadjib / Nadjib.Achir@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

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."

Warning : you must enter your e-mail address in order to save your application to Inria. Applications must be submitted online on the Inria website. Processing of applications sent from other channels is not guaranteed.

Instruction to apply

Defence Security :
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.

Recruitment Policy :
As part of its diversity policy, all Inria positions are accessible to people with disabilities.