Offer #2024-07777

Intrusion Detection in IoT 5G Networks.

Renewable contract : Yes

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 **39 project teams** , 27 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

The position is part of the 5G-mMTC research project aiming at deploying a 5G cellular network oriented “massive IoT”, compatible with 4G technology. The use cases are the Smart-Grid, in partnership with EDF and the connected bike, in partnership with the French Cycling Federation (FFC).

Assignment

As part of the project 5G-mMTC, some of the activities are targetting IoT in 5G Networks.

The massive influx of connected objects via 5G will increasingly be directed towards business processes for handling and integrating into decision-making processes. Consequently, application information systems are becoming increasingly vulnerable to attacks that can occur through sensors.

This position focuses on the study of intrusion detection systems (IDS) of cellular networks. We will focus start from the case of IoT networks such as LTE Cat-M and NB-IoT, and their evolution to 5G equivalents.

Main activities

More specifically, the objective of this task is to propose, deploy, and test an Intrusion Detection System for IoT traffic as a distributed edge application hosted and coupled with the 5G core network (Network Edge Architecture). Consequently, beyond merely routing traffic, the operator will ensure the evaluation of data trustworthiness before their injection into the information system (IS), as well as the detection and blocking of malicious traffic.

These edge treatments, integrated with the UPF (User Plane Function), require the development of algorithms based on AI (Machine Learning, Deep Learning, Federated Learning, etc.). This approach ensures a decoupling between the management of sensors and the IS. In other words, the operator will process the data from the sensor fleet, which can then be used and exploited by multiple application stakeholders for similar or heterogeneous needs. It should be noted that this function will open new B2B business models for telcos to commercialize data to business-oriented actors.

Skills

- Knowledge of one or more programming languages, preferably Python and C/C++.
- A good command of technical 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 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

Remuneration

Income in regards to professional experience

General Information

- **Theme/Domain :** Networks and Telecommunications
  System & Networks (BAP E)
- **Town/city :** Palaiseau
- **Inria Center :** Centre Inria de Saclay
- **Starting date :** 2024-11-01
- **Duration of contract :** 6 months
- **Deadline to apply :** 2024-10-30

Contacts

- **Inria Team :** TRIBE
- **Recruiter :**
  Adjih Cédric / Cedric.Adjih@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

- Some knowledge of the security mechanisms, and of intrusion detection
- A thesis in security or in telecommunications is a useful asset.
- Knowledge of the 5G protocol stacks, especially the 5G Core, and the data plane of 5G netowkrs
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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

- CV
- Cover letter
- Letter(s) of recommendation, where applicable

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.