2019-02008 - Intern Position - Design of a novel context-aware opportunistic forwarding strategy (M/F)

Level of qualifications required: Graduate degree or equivalent
Function: Internship Research

About the research centre or Inria department

The Inria Lille - Nord Europe Research Centre was founded in 2008 and employs a staff of 360, including 300 scientists working in sixteen research teams. Recognised for its outstanding contribution to the socio-economic development of the Hauts-de-France region, the Inria Lille - Nord Europe Research Centre undertakes research in the field of computer science in collaboration with a range of academic, institutional and industrial partners.

The strategy of the Centre is to develop an internationally renowned centre of excellence with a significant impact on the City of Lille and its surrounding area. It works to achieve this by pursuing a range of ambitious research projects in such fields of computer science as the intelligence of data and adaptive software systems. Building on the synergies between research and industry, Inria is a major contributor to skills and technology transfer in the field of computer science.

Context

The FUN research group investigates solutions to enhance programmability, adaptability and reusability of FUN (Future Ubiquitous Networks) composed of RFID, wireless sensor and robot networks. The objects that compose FUN are characterized by limited resources, high mobility and high security level in spite of untrusted environment. They communicate in a wireless way. To be operational and efficient, such networks have to follow some self-organizing rules. Indeed, components of FUN have to be able in a distributed and energy-efficient way to discover the network, self-deploy, communicate, self-structure in spite of their hardware constraints while adapting the environment in which they evolve.

https://team.inria.fr/fun/fr/

An intern position is available within the Inria FUN team in collaboration with the TRIBE team. The position is for a minimum of 5 months, and is intended for an experienced PhD student. The successful candidate will be based in the Inria Lille Nord Europe premises, France, with frequent visit to the Inria Saclay site close to Paris.

Assignment

In Low & Middle Income Countries, and in particular those situated in Sub-Saharan Africa, communication technologies have not yet delivered their potential. The lack of infrastructures is considered as one of the major problems that still prevent economical development [1].

In this context, communication technologies, in particular opportunistic communications, are seen as the catalytic power that will foster the development of these developing countries.

The literature brings interesting insights in the domain of opportunistic forwarding [2,3]. Nevertheless, we argue that the challenged context above-mentioned requires more than handling communication outages but also to adapt to the specific context of individual nodes and to the requirements of the different contents to be forwarded. In particular, content delivery strategies in mobile opportunistic networks do not usually consider particularities of nodes’ spatial and contextual conditions (speed, direction, resources, geographical locations, etc) [2].

Specifically, the successful candidate will work on the design and evaluation of a novel context-aware data forwarding strategy in wireless opportunistic networks. In particular, the novel protocol should take into consideration in the forwarding decision the environmental dynamics and heterogeneity of devices in terms of mobility features, external unexpected events (weather of traffic conditions, etc) and hardware constraints but also the content requirements.

The intern will have the opportunity to work with both synthetic and real-world datasets of mobile traffic, with the goal of evaluating and validating the design of the solution.


Main activities

Main activities:
- Analyse the requirements of context aware forwarding
- Propose a novel forwarding strategy for this context
- Evaluate the solution

Skills

We are looking for candidate that follows PhD studies in computer science with a relevant publication track who is creative in proposing solutions and capable of critical analysis of results. We demand the student:

1) to have at least 18 months of doctoral studies;
2) to have excellent skills in scripting and programming (e.g., python, C/C++, Java) as well as previous experience with simulation tools;

General Information

- Theme/Domain: Networks and Telecommunications
- System & Networks (BAP E)
- Town/City: Villeneuve d’Ascq
- Inria Center: CRI Lille - Nord Europe
- Starting date: 2020-01-01
- Duration of contract: 5 months
- Deadline to apply: 2019-12-01

Contacts

- Inria Team: FUN
- Recruiter: Nathalie Mitton / Nathalie.Mitton@inria.fr

About Inria

Inria, the French national research institute for the digital sciences, promotes scientific excellence and technology transfer to maximise its impact. It employs 2,400 people. Its 200 agile project teams, generally with academic partners, involve more than 3,000 scientists in meeting the challenges of computer science and mathematics, often at the interface of other disciplines. Inria works closely with many companies and has assisted in the creation of over 160 startups. It strives to meet the challenges of the digital transformation of science, society and the economy.

The keys to success

- INTERNSHIP
- RESEARCH GROUP: FUN

Instruction to apply

Interested candidates should contact Nathalie Mitton (nathalie.mitton@inria.fr) and Aline Carneiro Viana (aline.viana@inria.fr) by sending: *** their detailed curriculum vitae (including publications and references), a short motivation letter as well as at least one recommendation letter ***.

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 (PSPST). 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 PSPST. 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.

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.
3) to have a good track of publications (consistent with research experience)
4) to have a strong background in mobile networks and forwarding protocols;
5) to be familiar with solutions related to D2D or DTN;
6) to have a good experience with data analysis techniques and statistical tools;
7) to be fluent in spoken and written English with strong communication and presentation skills;
8) Experience with mobility modeling, resource management for wireless networks are considered a plus.

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

Gratification or remuneration according to statute