A PhD position is available within the Inria FUN. The position is for three years. The successful candidate will be based in the Inria Lille Nord Europe premises, France.

Mission confiée

-- Research scope --

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 [2,3,4]. 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].

-- Research objective --

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 research fellow 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. At last, a real in-situ scenario will be defined for validating the results over a real use case.

-- Time Schedule --

M1-M6: The PhD student will survey the different mobility models and extract some recognizable patterns to allow a fast and lightweight identification mechanism.

M7-M10: Based on the above mentioned analysis, the PhD will propose a novel mobility aware data forwarding mechanism. The new approach will be validated at least by experimentation.

M10-M12: Deep analysis of the cost and gains of the proposed mechanism. This analysis will be realized both theoretically and through experiments.

M13-M18: The proposed data forwarding will be enhanced with data priority awareness features. M18: Experimental validation. Analysis under real scenarios.

M25-M30: The proposed data forwarding will be enhanced with the analysis of the selection of data to send. M31-M34: Integration and experimental validation.

Informations générales

- Thème/Domaine : Réseaux et télécommunications
- Ville : Villeneuve d’Ascq
- Centre Inria : CRI Lille - Nord Europe
- Date de prise de fonction souhaitée : 2021-10-01
- Durée de contrat : 3 ans
- Date limite pour postuler : 2021-04-25

Contacts

- Equipe Inria : FUN
- Directeur de thèse : Mitton Nathalie / Nathalie.Mitton@inria.fr

A propos d’Inria

Inria is the national institute of research dedicated to the sciences of information. It is an independent, public, non-profit research organization that runs a series of ambitious research projects in such fields as computer science, engineering, mathematical sciences, and biological sciences. Inria is a major contributor to skills and technology transfer in the field of computer science.

Consignes pour postuler

CV + application letter + recommendation letters + school transcripts

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 traitement des candidatures.

Politique 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 sur le site Inria.
Combining Spatial and Social Awareness in D2D Opportunistic Routing, Ivan O. Nunes; Clayson Celes; Igor Nunes; Pedro O. S. Vaz de Melo; Antonio A. F. Loureiro, IEEE Communications Magazine (Volume: 56, Issue: 1, Jan. 2018)

L. Amaral et al. Oi!-opportunistic data transmission based on wi-fi direct, Infocom workshop 2016


Principales activités
The PhD student will be in charge of:
• Realize a survey of human mobility model and extract some efficient patterns
• Design a predictive approach able to dynamically categorize a movement
• Design a novel context-aware opportunistic forwarding strategy
• Implement and test the designed solution on real hardware platform

Compétences
We are looking for candidate that owns a Master degree in computer science, with a major in wireless networks and mobile systems, who is creative in proposing solutions and capable of critical analysis of results. We demand the student:
1) to have excellent skills in scripting and programming (e.g., python, C/C++, Java) as well as previous experience with simulation tools;
2) to have a strong background in mobile networks and forwarding protocol;
3) to be familiar with solutions related to D2D or DTN;
4) to have a good experience with data analysis techniques and statistical tools;
5) to be fluent in spoken and written English with strong communication and presentation skills;
6) Experience with mobility modeling, resource management for wireless networks are considered a plus.

Avantages
You will join a dynamic team of international scientific experts in the field of IoT (http://team.inria.fr/fun/)
You will participate in the design of innovative protocols with recognized research actors.
You will work in a stimulating and pleasant work environment (transport participation (50%), on-site catering, telecommuting, leave and special leave of absence (45 days), video conference equipment, technical laboratory for experimentation...)
You can benefit from quality training adapted to your needs and skills, whether technical, methodological or linguistic.
In addition to improving your technical skills, Inria offers you the opportunity to develop your entrepreneurial skills by taking part in awareness-raising events and training courses on the creation of start-ups (start-up horizon, intellectual property training, hackAthon, etc.) https://www.inria.fr/fr/inria-startup-studio
For international candidates, our administrative services will help you with the various administrative procedures (visa, residence permit, social security, housing, bank, etc.)

Rémunération
1st and 2nd year : 1 982€ Gross monthly salary (before taxes)
3rd year : 2 085€ gross monthly salary (before taxes)