2018-00530 - Post-doctorant (e) : When networking meets sociology

Level of qualifications required: PhD or equivalent
Fonction : Post-Doctoral Research Visit

About the research centre or Inria department

Located at the heart of the main national research and higher education cluster, member of the Université Paris Saclay, a major actor in the French Investments for the Future Programme (Idex, LabEx, IRT, Equipex) and partner of the main establishments present on the plateau, the centre is particularly active in three major areas: data and knowledge; safety, security and reliability; modelling, simulation and optimisation (with priority given to energy).

The 450 researchers and engineers from Inria and its partners who work in the research centre’s 31 teams, the 100 research support staff members, the high-level equipment at their disposal (image walls, high-performance computing clusters, sensor networks), and the privileged relationships with prestigious industrial partners, all make Inria Saclay Île-de-France a key research centre in the local landscape and one that is oriented towards Europe and the world.

Context

Today’s smart handheld devices allow heterogeneous free data gathering of human surrounding environment and networking usage patterns anytime and anywhere. Hence, an unprecedentedly large amount of human sensory data (i.e., the Big Data era) can be collected and processed: opening ways to connect people, technology, and business. This big data implies advanced knowledge of humans’ behaviour and interactions at a planetary scale and can help tackle networking challenges when used correctly. As our lives become more dependent on connectivity, it is easier to see that people have become eager to engage with mobile applications and connected services. Still, as more mobile-connected devices enter the market, the way people, processes, data, and things intelligently connect - the Internet of Everything (IoE) - will change everything about how we use/interact to the network and live our lives. Only technological advances will not be enough to deal with the new emerging challenges imposed by IoE. The ability to understand user behavior and to develop models across complex, interconnected systems is at the core of the required ability to uncover new insights and solutions in the IoE. Nevertheless, there is still a big gap between the way networking solutions are designed (e.g., usually limited to the needs of service providers or types of application) and the everyday behavior or needs of users. Many of them are designed to adapt to network conditions (e.g., physical link conditions, topology changes) and are protocol or service specific (e.g., successful delivery of messages, geographical network coverage). Hence, they are very often oblivious to users behavior and current needs.

Further information: https://team.inria.fr/infine/when-networking-meets-sociology/

Assignment

Thus, the main goal of this Post-Doctoral research is to improve network perception of users surrounding and behavior, allowing then the design of more tactful networking systems (i.e., to add perceptive senses to the network, by assigning it with the human like capabilities of observation, interpretation, and reaction to daily life features and involved entities). For this, we need to understand (1) how, where and for what they are used, (2) how the uses of smartphones vary, as well as (3) how the psycho-social behavior of smartphone usage operates.

Main activities

Current knowledge is fragmented because of the tendency of previous research to focus on: i) the study of specific behavior of smartphone use (ignoring thus complex interactions between behaviors), ii) small-N data on specific features of smartphone use, and iii) disciplinary-specific perspectives.

Building on that knowledge, this Post-Doctoral research aim at:
- first, to contribute a uniquely comprehensive account that improves on each of the above limitations. This is possible with the help of an original and extensive smartphone usage datasets that
we plan to analyze. This involves tasks related to dataset processing, enrichment and modeling as well as data analysis and knowledge extraction from considered datasets.

- Second, tactful networking has its basis on the capability of predicting (e.g., mobility, interests, type and demand of content, a person openness to new experiences and information, etc). Nevertheless, a particularity of predictive models is their over-reliance on past events and trends to predict future ones. Hence, one drawback is their inability to predict new behavior or uncertain events (e.g., predicting new places or changes in users' trajectories in case of random events) or still to capture the "exploration to new things" aspect of human. Building on the extracted knowledge described here above, this Post-doc research aim then to model the exploration pattern of people (i.e., some people are more prone to present uncertain behavior than others). The exploration pattern will thus feed our predictions models and better adjust accuracy.

**Skills**

Candidates are expected to have a strong background in one or more of the following fields: mobile communication networks, data mining, machine learning, statistical analysis, clustering algorithms, context and content modeling, algorithm design and implementation, scripting.

Requirements for this position also include:
- a PhD in a field related to the position topic
- an outstanding publication record in top-tier conference and journals
- fluency in written and spoken English.

**Benefits package**

- Subsidised catering service
- Partially-reimbursed public transport
- Social security
- Paid leave
- Flexible working hours
- Sports facilities

**Remuneration**

Monthly gross salary: 2.653 euros