2018-00554 - [Campagne CORDI-S-CRI Paris] Leveraging universal social networking and the IoT for urban-scale participatory systems

Contract type: Public service fixed-term contract
Level of qualifications required: Graduate degree or equivalent
Fonction: PhD Position
Level of experience: Recently graduated

Context

The worldwide use of the Internet and social networking has transformed the constraints of time and space in human interaction: we can now be heard at a massive scale unprecedented in human history. As a result, ICT may enable citizens to undertake both government through direct assembly and collective action at a scale and an efficacy previously considered impossible. Our research concerns this opportunity to leverage a new sort of political life. We focus specifically on how software systems may enable participatory democracy, that is, the participation of citizens in democratic assembly, action, and governance.

Toward the above, we investigate supporting middleware infrastructures that in particular enable universal social networking so as to allow citizens to engage using their favorite online social network services. The resulting middleware is called SocialBus and is released under open source license (at https://gitlab.inria.fr/usnb/universal-social-network-bus).

Main activities

Incentive mechanisms for participatory systems have been studied extensively in the literature. Building upon the research background of the Inria MIMOVE team, the PhD will more specifically focus on the study of solutions that leverage mobile networking and the IoT. Indeed, these are two essential elements for connecting people with their environment and communities, which may serve sustaining people’s participation across time.

References

- Emil Andriescu, Thierry Martinez, Valerie Issarny. Composing Message Translators and Inferring their Data Types using Tree Automata. FASE 2015 : 18th International Conference on Fundamental Approaches to Software Engineering, 2015, LNCS. https://hal.inria.fr/hal-01097389.
- Valerie Issarny, Vivien Mallet, Kinh Nguyen, Pierre-Guillaume Raverdy, Fadwa Rebhi, Raphael Ventura. Dos and Don’ts in Mobile Phone Sensing Middleware: Learning from a Large-Scale Experiment. The 2016 International Middleware Conference. https://hal.inria.fr/hal-01366610.
- Rafael Angarita, Nikolaos Georgantas, Valerie Issarny. USNB: Enabling Universal Online Social Interactions. IEEE International Conference on Collaboration and Internet Computing, 2017. Best paper award https://hal.inria.fr/hal-01591757.

Assignment

In the above context, a key challenge of our work lies in providing the right incentive for people to engage and keep getting involved.

Overcoming such a challenge through the study of relevant middleware support that may be reused across participatory systems is the focus of the PhD.

The keys to success

The candidate should be interested in contributing to the development of distributed systems, from design to prototype implementation and experiment.

Interest in social networking and social sciences is obviously a plus.

Conditions for application

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.

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.
The PhD work will in particular consider the following research questions:

- **How to leverage the IoT for participatory systems:** The objective here is to enrich the exchange among citizens through the provision of relevant observations from the physical environment. Things may further extend to “social things” (e.g., social bots) that autonomously communicate with the engaged citizens so as to foster interaction among them, while preserving their respective privacy.

- **How to support the continuous engagement of nomadic users:** Despite the increased capacity of smartphones, connectivity and relative resource constraints, esp. wrt energy, remain the norm. It is thus essential to customize protocols for the mobile case so that citizens are able to engage any-time, any-where, when that is the most relevant with respect to the purpose of the given participatory system.

To address the above questions, the PhD work will decompose into:

- State of the art survey of participatory systems and their applications, with a special focus on systems oriented toward participatory democracy, to become familiar of the overall topic of participatory systems and select a specific use case for experimental validation.
- Design of incentive mechanisms and supporting middleware protocols for participatory systems that leverage observations from both “physical” and “social” things, while preserving the required security and privacy properties.
- Customization of the proposed mechanisms for the mobile context.
- Prototype implementation of the above solutions as part of the SocialBus middleware.
- Evaluation of the proposed solutions.

**Skills**

Technical skills and level required: Master degree in Computer Science or Computer Engineering is required. Programming skills.

Languages: Fluency in English is required; it is not necessary to speak French.

Relational skills: Team spirit is essential

Other valued appreciated: Autonomy.

**Benefits package**

- Subsidised catering service
- Partially-reimbursed public transport

**Remuneration**

Gross Salary per month: 1 982 € the first 2 years and 2 085 € the last year