



Offer #2024-07705

Compositional Methods for Utility under Local Privacy Mechanisms

Contract type : Fixed-term contract

Renewable contract : Yes

Level of qualifications required : PhD or equivalent

Fonction : Temporary scientific engineer

Level of experience : More than 12 years

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 [40 project teams](#), 32 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 Comete project team at the Inria Saclay Center specializes in security and privacy protection and has sixteen researchers (<https://www.inria.fr/fr/comete>). The team studies concepts emerging from the modern era of computing. Security and privacy protection are among the fundamental concerns that arise in this context: the frequent interaction between users and electronic devices, and the continuous connection between these devices and the Internet, offer malicious agents the possibility of collecting and storing a huge amount of information without users even being aware of it. In addition to security issues, issues of correctness, robustness, and reliability are made more difficult by the complexity of modern systems because they are highly concurrent and distributed. Despite being based on impressive engineering technologies, they are still prone to faulty behavior due to errors in software design. To address these challenges, the team studies formal frameworks for specifying these systems, theories for defining desired correctness and security properties, and methods and techniques for proving that a system satisfies these properties.

Assignment

The purpose of this position is to work with the COMETE research team to develop methods and software for estimating statistics from data protected with local differential privacy (DP).

Classical data analysis methods like matrix inversion and iterative Bayesian update assume that all the users apply the same privacy mechanism and with the same privacy parameters. This is unfortunate because in principle the local model of privacy would allow users to use different mechanisms and different privacy settings, depending on their needs and preferences, on the kind of service they want to get in exchange for their data, etc.

The goal of this project is to remove the same-mechanism restriction and investigate efficient methods to achieve good precision of the distribution estimation in the scenario in which the mechanisms and/or the level of noise are very different from each other. This objective involves investigating the different estimation methods in this case.

Main activities

- Collaborate with the research team to develop efficient methods for statistical estimation from data protected by personalized local DP
- Develop programs based on the above methods
- Conduct experiments on real and synthetic data
- Write documentation and develop demos
- Write reports and papers

Skills

PhD in Computer Science on topics that require expertise in anonymization techniques.

Knowledge of data anonymization methodology;

Knowledge of methods for analyzing re-identification risk and associated inference risks, knowledge of measures of data usefulness for statistical analyses;

Practical knowledge of data analysis languages (R, Python, C++) and database management software (MySQL, etc.);

Ability to write scientific papers;

Ability to monitor methodologies;

Rigor, good organization, sense of priorities, autonomy;

Mathematical skills;

Teamwork skills ;

Very good level in written and oral English ;

Capability to work in a team.

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
- Social security coverage

Remuneration

according to profile

General Information

- **Theme/Domain** : Security and Confidentiality Statistics (Big data) (BAP E)
- **Town/city** : Palaiseau
- **Inria Center** : [Centre Inria de Saclay](#)
- **Starting date** : 2024-11-01
- **Duration of contract** : 12 months
- **Deadline to apply** : 2024-10-31

Contacts

- **Inria Team** : [COMETE](#)
- **Recruiter** :
Palamidessi Catuscia / Catuscia.Palamidessi@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.

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

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.