2018-00603 - PhD Position - Random and Smoothed Analysis of Walking Strategies in Planar Networks [S]

**Level of qualifications required:** Graduate degree or equivalent

**Other valued qualifications:** MSc in computer science or mathematics.

**Fonction:** PhD Position

**Context**

**Team**
Gamble, INRIA Nancy Grand-Est, gamble.loria.fr

**Contacts**
Olivier Devillers (Olivier.Devillers@inria.fr)

This PhD student will be involved in a collaboration with Carleton university.

**Assignment**

**Context**

Exploring planar networks is a central problem for algorithms such as point location in planar subdivision or routing in sensor networks. As for many problem in computational geometry the worst case complexity of such a problem is often irrelevant because the worst case is obtain using a peculiar distribution of the input which cannot really be encountered in real life situation. An alternative to the worst case analysis is the smoothed analysis, introduced to study linear programming, and applied afterwards to problems such as combinatorial complexity of convex hulls or algorithmic complexity of the clustering algorithm "k-means".

**Main activities**

**Project description**

The aim of this thesis is to apply smoothed analysis to routing algorithms n planar networks. There is a variety of such algorithms such as “greedy routing”, “compass routing”, “right-hand routing”, “Voronoi routing” some of them having variants (“randomized compass routing”). To be able to compare these different routing algorithms is of great importance for the efficiency of applications and the worst case analysis is definitively not the right tool. Analysis of these algorithms when the data are evenly distributed is of interest but, as worst case analysis, it seems a bit too simplifying for real situations. We will study those algorithms for distributions less regular than the uniform or Poisson distribution and in particular in the smoothed analysis paradigm that allows to tune how peculiar we allow the data to be.

Algorithms will be coded and possibly distributed using CGAL.

**Skills**

**Required qualifications**

MSc in computer science or mathematics.

Knowledge involved:

- mathematical aspects (probability)

**General Information**

- **Theme/Domain:** Algorithmics, Computer Algebra and Cryptology
- **Town/city:** Villers-lès-Nancy
- **Inria Center:** CRI Nancy - Grand Est
- **Starting date:** 2018-10-01
- **Duration of contract:** 3 years
- **Deadline to apply:** 2018-05-01

**Contacts**

- **Inria Team:** GAMBLE
- **Recruiter:** Devillers Olivier / olivier.devillers@inria.fr

**The keys to success**

**Application deadline**

May 1st, 2018 (Midnight Paris time)

**How to apply**

Upload your file on jobs.inria.fr in a single pdf or zip file, and send it as well by email to olivier.devillers@inria.fr.

Your file should contain the following documents:

- Your CV.
- A cover/motivation letter describing your interest in this topic.
- A short (max one page) description of your Master thesis (or equivalent) or of the work in progress if not yet completed.
- Your degree certificates and transcripts for Bachelor and Master (or the last 5 years).
- Master thesis (or equivalent) if it is already completed and publications if any (it is not expected that you have any).

Only the web links to these documents are preferable, if possible.

In addition, one recommendation letter
algorithmic aspects
C++ (templates, etc)

Language
French or English.

Benefits package
- Subsidised catering service
- Partially-reimbursed public transport
- French courses

Remuneration
Monthly salary after taxes: around 1596.05€ for 1st and 2nd year. 1678.99€ for 3rd year. (medical insurance included).

Applications are to be sent as soon as possible.

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- Master thesis (or equivalent) if it is already completed and publications if any (it is not expected that you have any). Only the web links to these documents are preferable, if possible.

In addition, one recommendation letter from the person who supervises(d) your Master thesis (or research project or internship) should be sent directly by his/her author to olivier.devillers@inria.fr.

Applications are to be sent as soon as possible.

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.