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

Niveau de diplôme exigé: Bac + 5 ou équivalent
Autre diplôme apprécié: MSc in computer science or mathematics.
fonction: Doctorant

Contexte et atouts du poste

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.

Mission confiée

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 obtained 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".

Principales activités

Project description

The aim of this thesis is to apply smoothed analysis to routing algorithms in 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 definitely 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.

Compétences

Required qualifications

MSc in computer science or mathematics.
Knowledge involved:

- mathematical aspects (probability)
- algorithmic aspects
- C++ (templates, etc)
Language
French or English.

Avantages sociaux
- Subsidised catering service
- Partially-reimbursed public transport
- French courses

Rémunération
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.
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 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.

Conditions pour postuler

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 recrutement.

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. Le traitement des candidatures adressées par d’autres canaux n’est pas garanti.