2018-00239 - [NEO] Post-Doctoral Researcher in Complex Network Analysis

Contract type: Public service fixed-term contract
Renewable contract: Oui
Level of qualifications required: PhD or equivalent
Function: Post-Doctoral Research Visit
Level of experience: Recently graduated

About the research centre or Inria department

The Inria Sophia Antipolis - Méditerranée center counts 37 research teams and 9 support departments. The center's staff (about 600 people including 400 Inria employees) is composed of scientists of different nationalities (250 foreigners of 50 nationalities), engineers, technicians and administrators. 1/3 of the staff are civil servants, the others are contractual. The majority of the research teams at the center are located in Sophia Antipolis and Nice in the Alpes-Maritimes. Six teams are based in Montpellier and a team is hosted by the computer science department of the University of Bologna in Italy. The Center is a member of the University and Institution Community (ComUE) "Université Côte d'Azur (UCA).

Context

PostDoc Opening at Inria Sophia Antipolis, France

https://www.inria.fr/
at Team NEO
https://team.inria.fr/neo/presentation/
under the supervision of Prof. K. Avrachenkov
e-mail: K.Avrachenkov@inria.fr
http://www-sop.inria.fr/members/Konstantin.Avrachenkov/me.html
This position is within the framework of the joint laboratory
Inria - Qwant Search Engine.

Assignment

Topic: Asynchronous distributed computation of network centrality measures

Resume:
We shall study asynchronously distributed methods (see e.g., [1,2,3]) for network centrality computation. 
The asynchronous distributed methods are very useful because they allow efficient and flexible use of computational resources on one hand (e.g., using cluster or cloud) and on the other hand they allow quick local update of centrality measures without the need to recompute it from scratch. 
As a case study, we start with PageRank [6] and then extend the methods to other centrality measures, in particular, to the centrality measure similar to betweenness centrality [4,5]. At the moment, there is no efficient asynchronous distributed algorithms for centrality computation. Most existing distributed approaches are not asynchronous.

Related references:

Adaptive on-line page importance computation. 
In Proceedings of the 12th international conference on World Wide Web (pp. 280-290). ACM.

Monte Carlo methods in PageRank computation: When one iteration is sufficient. 

In Algorithms and Models for the Web Graph: 13th International Workshop, WAW 2016, 

A Faster algorithm for betweenness centrality. 

A measure of betweenness centrality based on random walks. 
Social Networks, 27(1), pp.39-54.

The PageRank citation ranking: Bringing order to the web. 
Stanford InfoLab Research Report.
Main activities
The main activity is writing journal and conference papers with possibility of patenting algorithms.

Skills
Requirements:
- PhD in Mathematics, Computer Science, Electrical Engineering or Physics;
- Solid background in Linear Algebra, Probability and Statistics is expected;
- Experience in machine learning is a plus;
- Knowledge of python is another plus.

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

Remuneration
Gross Salary: 2650 brutto per month