2018-00746 - [NEO] Post-Doctoral Researcher in Machine Learning

Contract type: Public service fixed-term contract
Renewable contract: Oui
Level of qualifications required: Graduate degree 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 - Nokia Bell Labs.

Assignment

Topic: Statistical Physics Methods for Distributed Machine Learning

Detailed description: Over the last few years, research in computer science has shifted focus to machine learning methods for the analysis of increasingly large amounts of user data. As the research community has sought to optimize the methods for sparse data and high-dimensional data, more recently new problems have emerged, particularly from a networking perspective that had remained in the periphery. These new directions go beyond sparsity of data and concern the distributed nature of data sources as well as the computation itself.

We feel that statistical physics methods such as Gibbs sampling [3] and Generalized Potts Model [2,4] are particularly well suited to design light complexity, distributed machine learning methods for the tasks of unsupervised and semi-supervised learning [1].

The candidate is expected to work on both theoretical and practical aspects of the topic. We intend to employ both mean-field methods [5] and replica method [6] for the analysis of the statistical physics based machine learning algorithms.

References:


Clustering data through an analogy to the Potts model.

[3] Bremaud, P.
Markov chains: Gibbs fields, Monte Carlo simulation, and queues.

A Spin-Glass Model for Semi-Supervised Community Detection.

[5] Nishimori, H.
Statistical physics of spin glasses and information processing: An introduction.

Information, physics, and computation. Oxford University Press.

Main activities

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Information, physics, and computation. Oxford University Press.
The main activity is writing journal and conference papers with possibility of patenting algorithms.

Skills

Requirements:
- PhD in Mathematics, Computer Science or Physics is required.
- Good knowledge of probability or statistical physics.
- Knowledge of 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: 2653€ brutto per month