CentraleSupélec

FACULTY RECRUITMENT PROFILE

Full Professor

(Laboratory of Signals and Systems / L2S and Signal, Information, Communication Faculty)

Title: Full Professor in machine learning, information theory and communications

Position: Full Professor in machine learning, information theory and communications, at Signal, Information, Communication Faculty at CentraleSupélec, Paris-Saclay Campus / Laboratory of Signals and Systems (L2S), CNRS UMR 8506

CNU Section: 27

Domain:
The position is at the interface between machine learning, information theory and communications, in order to better understand the fundamentals of machine learning.

Keywords:
Machine learning, information theory, communications, deep learning

CentraleSupélec is a public scientific, cultural and professional institution (EPSCP in French) under the authority of the Ministry of Higher Education and Scientific Research and the Ministry of the Economy, Industry and Digital Technology. Its main missions are: the training of high-level scientific general engineers, research in engineering and systems sciences, and executive education.
The Signal, Information, Communication Faculty is an academic department at CentraleSupélec whose educational scope covers the fields of signal processing, statistics, telecommunications, networks for the 3-year CentraleSupélec Engineering Program. The department also manages the Master programs « Advanced Wireless Communications Systems » and « Multimedia Networking » for Université Paris Saclay.
The Laboratory of Signals and Systems (L2S) is a joint CNRS-CentraleSupélec unit. The main areas of research include fundamental and applied mathematical aspects of control theory, AI, data science, information, signal and image processing, communication, and network theory. These activities are organized around three targeted themes: control and systems, signal processing and statistics, telecommunications and networks.

Academic profile:

The candidate will be part of the Signal, Information, Communication Faculty. He/she will engage with courses on applied mathematics, statistical learning, artificial intelligence, information theory, and communications that form part of the CentraleSupélec engineering program. He/she will be mainly

involved in the major on “Communicating Systems and Connected Objects,” as well as in more specialized teaching activities such as the “Research Track” and the concentration on “Intelligent Systems and Networks.” He/she will also participate in the international Master Programs “Advanced Wireless Communications Systems” and “Multimedia Networking.”
As some of these courses are taught in English, the ability to teach in English is expected.

Research profile:

The candidate will join the L2S Laboratory, whose research activities include fundamental and applied mathematical aspects of control theory, AI, data science, information, signal and image processing, communication, and network theory. The candidate will be expected to develop/research the interface between machine learning, information theory, and communications to understand machine learning fundamentals better.
More specifically, machine learning methods are the subject of great interest due to their effectiveness in many situations, whether in competition with conventional methods or to solve problems that remain widely open up to now. However, results on their performance and their robustness are essential for effective use of these techniques in many fields. Indeed, impressive results can sometimes be seriously compromised in other similar situations. Consequently, even if it is centered on modern machine learning and its applications, the position also aims at an analysis based on complementary tools to understand its underlying mechanisms better and overcome its weak points. In particular, it is foreseen that telecommunications tools, such as information theory, optimization, statistical security, etc., can help formalize the interaction between machine learning theory and application aspects.
We can already mention some directions relating to this approach:
1. Existing algorithms require improvements on certain aspects: reproduction of biases (often hidden) in statistical learning, catastrophic forgetfulness in the event of continuous learning, understanding generalization capabilities beyond the learning set, etc.
2. The explainability of the results must be improved: it is necessary to obtain models allowing an interpretation of the predictions according to the data's characteristics, the first step towards explainable results.
3. Finally, the reliability of the results and the security of both the information contained in the data and the machine learning algorithms are two aspects that it is necessary to quantify and improve in order to consider the use of this type of learning method in many applications.

The DATAIA Paris-Saclay Institute and the team's strong links with industrial partners and Canadian teams in Montreal with complementary skills will provide a favorable ecosystem to develop this research.
The candidate must demonstrate the ability to collaborate and lead research activities by participating in student work supervision and should be able to establish academic and industrial partnerships on this activity at the national and international level.

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Recruitment interview:

For the candidates selected for the audition, the audition will take place in three stages:

- A presentation of the candidate's background and integration project;
- An illustration of a 5-minute lesson, given in English, on a problem, whose subject is identical for all candidates, will be specified on the invitation;
- An exchange with the members of the committee.

The duration of the three parts of the audition will be specified in the invitation letter.

Contacts:

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For all administrative information, please contact the Department of Human Resources:

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Documents à fournir :(tous les documents doivent être téléversés dans Galaxie au plus tard à la date de cloture des inscriptions, merci de consulter le guide d'utilisation du module FIDIS):

- une copie d'une pièce d'identité avec photographie ;
- une pièce attestant de la possession de l'un des titre s mentionnés au 1° de l'article 46 du décret du 6 juin 1984 susvisé ;
- un curriculum vitae donnant une présentation analytique de leurs travaux, ouvrages, articles, réalisations et activités en précisant ceux qui sont joints ;
- un exemplaire d'au moins un des travaux, ouvrages, articles et réalisations parmi ceux mentionnés dans le curriculum vitae ;
- une copie du rapport de soutenance du diplôme détenu, le cas échéant.

Les documents administratifs en langue étrangère doivent être traduits en français.

Lien portail GALAXIE :
https://galaxie.enseignementsup-recherche.gouv.fr/antares/can/index.jsp