



Offer #2024-08159

Post-Doctoral Research Visit F/M Faster Bilevel Optimization to Accelerate Machine Learning

Contract type : Fixed-term contract

Renewable contract : Yes

Level of qualifications required : Graduate degree or equivalent

Fonction : Temporary scientific engineer

About the research centre or Inria department

The Inria Saclay-Île-de-France Research Centre was established in 2008. It has developed as part of the Saclay site in partnership with Paris-Saclay University and with the Institut Polytechnique de Paris since 2021.

The centre has 39 project teams, 27 of which operate jointly with Paris-Saclay University and the Institut Polytechnique de Paris. Its activities occupy over 600 scientists and research and innovation support staff, including 54 different nationalities.

Context

Environment. The postdoc will take place in Inria Saclay, in the MIND team. This is a large team working focused on mathematical methods for statistical modeling of brain function using neuroimaging data (fMRI, MEG, EEG). Particular topics of interest include machine learning techniques, numerical and parallel optimization, applications to human cognitive neuroscience, event detection, and scientific software development. A particular emphasis is put on interdisciplinary projects.

Assignment

Numerical evaluation of novel methods, a.k.a. benchmarking, is a pillar of the scientific method in machine learning. However, due to practical and statistical obstacles, the reproducibility of published results is currently insufficient: many details can invalidate numerical comparisons, from insufficient uncertainty quantification to improper methodology. In 2022, the benchopt initiative provided an open source Python package together with a framework to seamlessly run, reuse, share, and publish benchmarks in numerical optimization. In this project, we aim at bringing benchopt to the whole machine learning community, making it a new standard in benchmarking by empowering researchers and practitioners with efficient and valid benchmarking methods. Our goal is to ensure reproducibility and consistency in model evaluation. We will federate the machine learning community to develop informative and statistically valid benchmarks, while providing methods to reduce identified hurdles in implementing such practices. The results of the project will be integrated in the open source benchopt library.

The engineer will aim to develop tools to simplify benchmarking methods while optimizing the hyper-parameters. During this 4-month contract, the engineer will robustify the pipeline to launch jobs with various parameter configurations and to control the randomness in the different runs.

Main activities

Main activities :

- Implement novel solution to improve running various hyper-parameters setting in parallel.
- Design an easy to use API for users.
- Program, run, and analyze benchmarking results.

Complementary activities

- Participate to the teams activities : scientific meetings, seminars, scientific presentations.

Skills

- Strong mathematical background. Knowledge in optimization is a plus.
- Good programming skills in Python. Knowledge of a deep learning framework is a plus.
- The candidate should be proficient in English. Knowing French is not necessary, as daily communication in the team is mostly in English due to the strong international environment.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Leave: 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours) + possibility of exceptional leave (sick children, moving home, etc.)
- Possibility of teleworking and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage

Remuneration

2788 € gross/month

General Information

- **Theme/Domain** : Optimization, machine learning and statistical methods
Statistics (Big data) (BAP E)
- **Town/city** : Palaiseau
- **Inria Center** : [Centre Inria de Saclay](#)
- **Starting date** : 2024-10-01
- **Duration of contract** : 3 months
- **Deadline to apply** : 2024-12-31

Contacts

- **Inria Team** : [MIND](#)
- **Recruiter** :
Moreau Thomas / thomas.moreau@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

The keys to success

We seek candidates strongly motivated by challenging research topics in machine learning for science. Applicants should have a strong mathematical background with knowledge of numerical optimization and machine learning. With regards to software engineering, proficiency in Python is expected and experience in applying ML to large-scale data is a plus.

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.

Instruction to apply

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.