Offer #2023-07006

Internship - Federated Learning with Communication Constraints

Contract type: Internship agreement
Level of qualifications required: A levels or equivalent
Function: Internship Research
Level of experience: Recently graduated

About the research centre or Inria department

The Inria research centre in Lyon is the 9th Inria research centre, formally created in January 2022. It brings together approximately 300 people in 16 research teams and research support services.

Its staff are distributed at this stage on 2 campuses: in Villeurbanne La Doua (Centre / INSA Lyon / UCBL) on the one hand, and Lyon Gerland (ENS de Lyon) on the other.

The Lyon centre is active in the fields of software, distributed and high-performance computing, embedded systems, quantum computing and privacy in the digital world, but also in digital health and computational biology.

Assignment

Many domains, from image processing to communications, now rely heavily on machine learning (including deep learning) for decision making (e.g., classification or regression). However, machine learning relies on data which may not be located in a single data center. For example, data is often collected by large-scale networks of devices in the Internet of Things (IoT). In this case, communication with a processor is required in order to train classifiers. In the IoT, communication is limited due to resource constraints. One solution to dealing with data distributed over a number of communication-constrained devices is federated learning.

Working with Dr Malcolm Egan (Inria) and Prof. Bapi Chatterjee (IIIT-Delhi), the candidate will investigate the impact of communication strategies for state-of-the-art federated learning algorithms. This will include device scheduling, incorporating issues arising in practical networks, such as packet losses.

Main activities

The main activities are:

- Coding federated learning algorithms.
- Experimental study of performance accounting for communication constraints.

Skills

- Python
- Experience with deep learning packages (e.g., PyTorch)
- Fluency in spoken and written English.

Benefits package

- Subsidized meals
- Partial reimbursement of public transport costs
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Social, cultural and sports events and activities

Remuneration

Minimum legal gratification
General Information

- **Theme/Domain**: Networks and Telecommunications System & Networks (BAP E)
- **Town/city**: Villeurbanne
- **Inria Center**: Centre Inria de Lyon
- **Starting date**: 2023-02-01
- **Duration of contract**: 6 months
- **Deadline to apply**: 2024-01-08

Contacts

- **Inria Team**: MARACAS
- **Recruiter**: Egan Malcolm / malcom.egan@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.

**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

Applications must be submitted online on the Inria website.

Processing of applications sent by other channels is not guaranteed.

**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.