



Offer #2020-02695

Engineer (M/F) : Sequential Recommendation for Sustainable Gardening

Contract type : Civil Servants Mobility (EU) or Fixed-term contract

Renewable contract : Yes

Level of qualifications required : Graduate degree or equivalent

Fonction : Temporary scientific engineer

Level of experience : From 3 to 5 years

About the research centre or Inria department

The Inria Lille - Nord Europe Research Centre was founded in 2008 and employs a staff of 360, including 300 scientists working in sixteen research teams. Recognised for its outstanding contribution to the socio-economic development of the Hauts-De-France région, the Inria Lille - Nord Europe Research Centre undertakes research in the field of computer science in collaboration with a range of academic, institutional and industrial partners.

The strategy of the Centre is to develop an internationally renowned centre of excellence with a significant impact on the City of Lille and its surrounding area. It works to achieve this by pursuing a range of ambitious research projects in such fields of computer science as the intelligence of data and adaptive software systems. Building on the synergies between research and industry, Inria is a major contributor to skills and technology transfer in the field of computer science.

Context

Sequel is a research group. Sequel is an acronym for "Sequential Learning". In short, with less technical words: we investigate how we can create software that, in some way, adapts to its users, or its environment more generally. For that purpose, the software learns. Formally, Sequel is a research group belonging to the INRIA Lille-Nord Europe research center, and the CRISTAL. The permanent members of Sequel are employed either by Inria, or by the CNRS, or by the University of Lille. The non permanent members may also be employees of companies.

The aim of **Sequel** is to study the resolution of sequential decision problems. For that purpose, we study sequential learning algorithms with focus on reinforcement and bandit learning. We put an emphasis on the use of concepts and tools drawn from statistical learning. Our work spans from theory of learnability, to the design of efficient algorithm, to applications.

The Inria team Sequel is a very active, united, hard-working, internationally renowned and connected research team specialized on theoretical and applied aspects of machine learning for sequential decision making with noisy or partial feedback. It feeds a regular research seminar, classes in several masters and has direct connections with a number of companies. Sequel was the organizing team of the 32nd International Conference in Machine Learning that was held in Lille in 2015, and is generally experienced in managing international research events. Sequel has strong connection with other research groups in Europe and beyond. Moreover, other research teams working on complementary topics (e.g. Magnets, Sigma, Links) are physically located within walking distance of the Sequel offices, which triggers rich scientific interactions.

The Sequential Recommendation for Sustainable Gardening (SR4SG) project:

Identification and sharing of good, sustainable agriculture practice is both a scientific and societal challenge. The high-scalability of recommender systems, coherently aggregating data from millions of actively engaged users and constantly benefiting from research in machine learning, suggests connecting this field to sustainable agriculture may answer this challenge with significant success. The goal of the 4-year project "Sequential Recommendation for Sustainable Gardening (SR4SG)", headed by Odalric-ambrym Maillard from Sequel is threefold: 1) to gather researchers in the fields of recommender systems, sequential and reinforcement learning on the one hand, and in sustainable agriculture, ecology and biodiversity preservation on the other hand, to form an ambitious mixed community working in close collaboration. 2) to create a crowdsourced platform of "participative science" to collect sequential observations and actions in everyone's garden, that will enable users to receive constantly improving recommendations involving state of the art algorithms, and researchers to organize recommendation challenges and improve their understanding of sustainable agricultural practice at large. 3) to lay the theoretical foundations of sequential learning for sustainable gardening, identify the novel bottlenecks and engage the reinforcement learning community in the process of solving them. This project funds two year of engineer, one year of postdoc, and several workshops in order to make significant progress

on these three ambitious points.

The SR4SG exploratory project is expected to have interactions with the project “65 Millions d’observateurs” of the Muséum National d’Histoire Naturelle (MNHN), and in particular their platform <http://sciences-participatives-au-jardin.org>, as well as other teams such as Inria team Beagle in Grenoble (extending the project <http://mon-potager.org>) and Spirals in Lille, working in Database, and is also expected to interact with researchers from CIRAD (Centre International de Recherche Agronomique pour le Développement), in an highly stimulating international and interdisciplinary context.

Further details about the project can be provided upon request.

More information :

About Inria Lille – Nord Europe: <https://www.inria.fr/centre/lille>

About team SequeL: <https://team.inria.fr/sequel/>

About Odalric-ambrym Maillard: <https://odalricambrymmaillard.neowordpress.com/>

About SR4SG: <https://project.inria.fr/sr4sg/>

Assignment

Under the direct command responsibility of Odalric-Ambrym Maillard, the Principal Investigator of the SR4SG project, and in the context of the SR4SG project, the role of the engineer will be to **develop the core of the data-acquisition platform** called WeGarden, extending the existing prototype with same name to a full-blown software. This includes both back-end and front-end development. This platform is expected to be used by a large collection of users (hence it should be scalable), and will have two aspects:

- 1) a recommendation part for gardeners on the one hand,
- 2) a research part for researchers to study the collected data and test novel strategies on the other hand.

The platform should be developed, when possible, in order to connect easily with the MNHN platform.

Main activities

- Develop: back-end and front-end of the WeGarden platform, in a scalable and modular way.
- Communicate: primary with Inria team SequeL (PI of the project recommendation) and MNHN team Cesco, as well as Inria team Spirals (Database) and Inria team Beagle (Computational Biology).

Skills

Required qualities

- Excellent communications skills, due to the interdisciplinary nature of the project.
- Sense of organization, autonomy, rigor
- Taste for teamwork
- Listening and communicating with non-technical contacts;
- Writing notes/reports
- Good knowledge of English

Required Diploma and experience : A Master related to software development.

A strong background in software engineering, including both back and front-end development is required, oriented towards large-scale systems and crowdsourced data.

Experience with large database is a plus.

Experience with previous crowdsourced data acquisition platform is a plus.

Knowledge of API Rest and React Native is a plus.

Experience with development of recommender systems is a plus.

Basic knowledge of Machine Learning and or Statistics is a plus.

An introductory knowledge of Reinforcement Learning, Recommender Systems, as well as some notions of statistics is a plus.

No prior knowledge in agronomy is required, but a taste for sustainable agriculture is welcomed.

Benefits package

- Participation in transports costs / Partial reimbursement of public transport costs
- Possibility of restoration on site/ Subsidized meals

- Leave : 7 weeks of annual leave + 10 extra days off due to RTT (statutory reduction in working hours)
- Possibility of teleworking (after 6 months of employment) and flexible organization of working hours
- Professional equipment available (videoconferencing, loan of computer equipment, etc.)
- Access to vocational training
- Possibility of French courses
- Social, cultural and sports events and activities

Remuneration

according to experience

General Information

- **Theme/Domain** : Optimization, machine learning and statistical methods
Software Experimental platforms (BAP E)
- **Town/city** : Villeneuve d'Ascq
- **Inria Center** : [Centre Inria de l'Université de Lille](#)
- **Starting date** : 2020-11-01
- **Duration of contract** : 2 years
- **Deadline to apply** : 2020-12-31

Contacts

- **Inria Team** : [SC00L](#)
- **Recruiter** :
Maillard Odalric-ambrym / Odalric.Maillard@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

- **Skills**
 - Autonomy, driving force.
 - Expertise in software development and architecture, smartphone applications.
 - Automated testing
 - Continuous integration, devops
 - Quality software
 - Layer architecture
 - Databases (SQL, noSQL)

The position is primary intended to 2-5 years experienced software developer, but is also opened to less experienced candidates.

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

CV, application letter, list of publications, one or more letters of recommendation and a short research statement.

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.

