Offer #2024-07860

SRP Temporary Research Position on graph data management

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Tempary Research Position

About the research centre or Inria department

The Centre Inria de l'Université de Grenoble groups together almost 600 people in 22 research teams and 8 research support departments.

Staff is present on three campuses in Grenoble, in close collaboration with other research and higher education institutions (Université Grenoble Alpes, CNRS, CEA, INRAE, ...), but also with key economic players in the area.

The Centre Inria de l'Université Grenoble Alpes is active in the fields of high-performance computing, verification and embedded systems, modeling of the environment at multiple levels, and data science and artificial intelligence. The center is a top-level scientific institute with an extensive network of international collaborations in Europe and the rest of the world.

Context

Within the framework of the GraphRec Project (http://tyrex.inria.fr/graphrec), the Tyrex team investigates efficient graph exploration techniques with an algebraic approach, and recently an extended relational algebra for optimising recursive queries [1,4]. This is achieved through the introduction of a new fixpoint operator, new rewrite rules, and new query evaluation plan enumeration techniques that enable new query evaluation plans that used to be out of reach with earlier approaches. One important application of this theory is the optimization of recursive queries over graphs, such as the ones found in recent graph query languages [2,3]. In particular, the theory muRA has been proved very useful to optimize UCRPQs queries over knowledge graphs.
Property graphs are even more general than knowledge graphs as they allow both edges and vertices to be annotated not only with a label but also with a list of key/value pairs. This led to the development of specific query languages for property graphs with various characteristics [3]. The proposed research includes further investigating extensions of this theory in the context of query languages suited for more general graphs such as property graphs, in particular in the presence of schema information.

References:

[1] Louis Jachiet, Pierre Genevès, Nils Gesbert, Nabil Layaïda: On the Optimization of Recursive Relational Queries: Application to Graph Queries. SIGMOD Conference 2020, pages 681-697. https://hal.inria.fr/hal-01673025/document

[2] Angela Bonifati, George H. L. Fletcher, Hannes Voigt, Nikolay Yakovets:
Querying Graphs. Synthesis Lectures on Data Management, Morgan & Claypool Publishers 2018

[3] Chandan Sharma, Roopak Sinha, Kenneth Johnson: Practical and comprehensive formalisms for modelling contemporary graph query languages. Inf. Syst. 102: 101816 (2021).

[4] Amela Fejza, Pierre Genevès and Nabil Layaïda: Efficient Enumeration of Recursive Plans in Transformation-based Query Optimizers. In Proceedings of the 50th International Conference on Very Large Databases (VLDB'24), 2024 (to appear), 2024.

Assignment

The candidate will be respondible for conducting research activities at the highest level in data management.

Main activities

As a first step, works will consist in the further development and publication of the approach co-investigated in [5].

References:

[5] Chandan Sharma, Pierre Genevès, Nils Gesbert, Nabil Layaïda: Schema-Based Query Optimisation for Graph Databases. arXiv:2403.01863 preprint, 2024. https://arxiv.org/abs/2403.01863

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 (90 days / year) and flexible organization of working hours (except for internship)
- Social, cultural and sports events and activities
- Access to vocational training
- Social security coverage under conditions

Remuneration

Gross salary per month from 3 085 € (depending on international experience and qualifications).

General Information

- **Theme/Domain :** Data and Knowledge Representation and Processing
- **Town/city :** Montbonnot
- **Inria Center :** Centre Inria de l'Université Grenoble Alpes
- **Starting date :** 2024-11-01
- **Duration of contract :** 2 years
- **Deadline to apply :** 2024-07-18

Contacts

- **Inria Team :** TYREX
- **Recruiter :**
  Genevès Pierre / pierre.geneves@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

There you can provide a "broad outline" of the collaborator you are looking for what you consider to be necessary and sufficient, and which may combine :

- tastes and appetencies,
- area of excellence,
- personality or character traits,
- cross-disciplinary knowledge and expertise...

This section enables the more formal list of skills to be completed and 'lightened' (reduced) :

- "Essential qualities in order to fulfil this assignment are feeling at ease in an environment of scientific dynamics and wanting to learn and listen."
- " Passionate about innovation, with expertise in Ruby on Rails development and strong influencing skills. A thesis in the field of **** is a real asset."

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.