Offer #2024-07840

Post-Doctoral Research Visit F/M Formal modeling and analysis for automated transportation systems

Contract type : Fixed-term contract

Level of qualifications required : PhD or equivalent

Fonction : Post-Doctoral Research Visit

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

A 16-month postdoctoral position, starting at September 1st, 2024 is available at the Inria research center of Univ. Grenoble Alpes in the CONVECS team. The candidate will have the opportunity to work in the EU project A-IQ Ready funded by Chips JU.

The onset of climate change and widespread geopolitical conflicts and social inequalities showcase the need for innovation and change that require a better world. Now technologies like artificial intelligence, the Internet of Things, robotics and other related technologies are making such a world all the more feasible. The A-IQ Ready project aims to introduce and materialise an intelligent autonomous ECS (Electronic Component and System) fit for our digital age and utilise crucial technologies, like edge continuum orchestration for artificial intelligence, distributed collaborative intelligence and quantum sensing, which could prove revolutionary for most services and industries. These technologies and their combination will propel the transition to a Europe of Society 5.0.

The activities of CONVECS focus on the formal modeling and verification of asynchronous concurrent systems, which are instantiated in various domains (communication protocols, distributed algorithms, embedded systems, networks-on-chip, etc.). To this aim, CONVECS proposes new generation formal languages for specifying the behavior and the properties of concurrent systems, and devises efficient verification algorithms and tools running in the CADP verification toolbox, which assists the various phases of the design process (compilation and rapid prototyping, interactive and guided simulation, model checking and equivalence checking, conformance test generation, co-simulation, performance evaluation) and is widely used in academia and industry.

Assignment

Automated vehicles are complex systems involving a large number of hardware and software components that must interact (often asynchronously) and cooperate to assist decision making in a reliable way. Due to this complexity, the design process of these systems must integrate formal methods and analysis techniques, as recommended by current standards, e.g., ISO 26262.

The candidate will undertake, in collaboration with researchers of the CONVECS team and with international partners of the A-IQ Ready project, the formal modeling of automated transportation systems (outdoor truck transportation, indoor logistics) considered as use cases within the project. The candidate will study the behaviour of these systems and propose the applications of various analysis methods (model checking, equivalence checking, conformance test generation, probabilistic verification, etc.) to assess the correctness and reliability of these systems.

The candidate will also interact (by video-conference) with project partners to exchange information on the informal specifications of the systems considered and the formal modeling approaches employed.

Main activities

The candidate will devise formal models describing the behaviour and the correctness properties of the systems under study, and study their reliability using various analysis techniques.

The candidate will also contribute to the writing of various deliverables scheduled in the A-IQ Ready project.

Skills

Technical skills and level required : knowledge of specification languages for concurrent asynchronous systems

Languages : proficiency in English; knowledge of French also welcome

Relational skills : team working

Benefits package

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  - 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 intership)
  - Social, cultural and sports events and activities
  - Access to vocational training
  - Social security coverage under conditions

Remuneration

2788 € gross salary / month

General Information

- **Theme/Domain :** Proofs and Verification
  Software engineering (BAP E)
- **Town/city :** Montbonnot
- **Inria Center :** Centre Inria de l'Université Grenoble Alpes
- **Starting date :** 2024-09-01
- **Duration of contract :** 1 year, 4 months
- **Deadline to apply :** 2024-07-14

Contacts

- **Inria Team :** CONVECS
- **Recruiter :**
  Mateescu Radu / radu.mateescu@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

The candidate should possess a solid background in the formal modeling and verification of concurrent systems. A taste for software development and experimentation is strongly desired.

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 via the Inria website. Processing of applications submitted via 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.