Offer #2021-03963

Engineer F/M. Performance debugging & optimization. Instrumentation.

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Fonction : Temporary scientific engineer

Level of experience : More than 12 years

About the research centre or Inria department

Grenoble Rhône-Alpes Research Center groups together a few less than 650 people in 37 research teams and 8 research support departments.

Staff is localized on 5 campuses in Grenoble and Lyon, in close collaboration with labs, research and higher education institutions in Grenoble and Lyon, but also with the economic players in these areas.

Present in the fields of software, high-performance computing, Internet of things, image and data, but also simulation in oceanography and biology, it participates at the best level of international scientific achievements and collaborations in both Europe and the rest of the world.

Context

CORSE is a joint research group in the LIG laboratory that regroups several expertise that stand at the interface between software and hardware: those are domain specific application/library tuning, compiler optimization, run-time systems, and debugging/monitoring. Our domains of application include performance (both speed and energy consumption), reliability, and teaching of computer science. An important activity concerns the optimization of machine learning applications for some specific high-performance embedded architectures.

Assignment

The aim of the position is to contribute to the maturation of tools developped by CORSE and its collaborators. Those include:

- GUS is a performance debugging tool which we expect to interface with LLVM-MCA
- TTile is a code generator for CNN kernels which we expect to integrate in TVM
- BISM is a Bytecode-Level Instrumentation tool for Software Monitoring

Main activities

The main activities include:

- Understand TVM infrastructure and its porting to Kalray architecture.
- Evaluate the difficulty of using different micro-kernels in TVM
- Understand TTile code generator
- Evaluate the difficulty of adapting TTile to one node of Kalray architecture

The execpted developments shall be all or part of:

- Finish the adaptation of Telamon on Kalray (use of OpenMP-4 for offloading)
- Develop a prototype that allows the use of different micro-kernels in TVM
- Develop a prototype that is based on TTile, that generates optimized code for one node

Skills

The position requires:

- A high expertize in compiler technology (static compilation, compiler design, binary translation, JIT, ...)
- A high expertize in compiler optimization (data locality, parallelism, scalar evolution & strenght

reduction)
- Some knowledge concerning deep-learning applications
- Good programming skills in C, C++ STL Python, Java

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

Gross salary : from 2 562 euros to 5 264 euros before deduction of tax incomes depending on laboral experiences and degrees.

General Information

- **Theme/Domain :** Architecture, Languages and Compilation
  System & Networks (BAP E)
- **Town/city :** Grenoble
- **Inria Center :** Centre Inria de l'Université Grenoble Alpes
- **Starting date :** 2021-11-01
- **Duration of contract :** 11 months
- **Deadline to apply :** 2021-10-01

Contacts

- **Inria Team :** CORSE
- **Recruiter :**
  Rastello Fabrice / fabrice.rastello@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

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.