Offer #2024-08464

Research & Development Engineer position on Embedded Bayesian Perception and Navigation for Mobile Robotics and Autonomous Vehicles at Inria, in Grenoble, France

Contract type : 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 research centre in Lyon is the 9th Inria research centre, formally created in January 2022. It brings together approximately 300 people in 17 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. Some are also located in the Inria centre of Grenoble, in Montbonnot.

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.

Context

Chroma is an Inria research team located in Lyon and Grenoble, which aims at designing algorithms and models to allow autonomous agents to perceive, decide, learn and adapt to their environment, by bringing together probabilistic methods, machine learning, planning techniques, multi-agent decision making, and constrained optimisation tools.
The team develops and maintains many experimental plateforms, and is involved in many academic and industrial projects in the field of Mobile Robotics and Autonomous Vehicles.

The one year (renewable to pluriannual) Research & Development Engineer available position falls within the scope of long-term projects in Grenoble, including :
- a multi-annual project of IRT Nanoelec, in cooperation with CEA and several industrial partners, which aims to develop, validate and transfer embedded bayesian perception and navigation systems on vehicles, notably experimenting with an autonomous Zoe vehicle (see video at
https://inria.hal.science/medihal-01963296v1)
- the starting ANR research Challenge Mobilex, which aims at evaluating different technological solutions integrating all the functions and constraints to be taken into account to manage the local trajectory of a land vehicle in an autonomous way in a complex environment, in which a Shark Robotics all-terrain Barakuda robot is set to be equipped and experimented with (see https://anr.fr/en/call-for-proposals-details/call/challenge-mobilex-mobility-in-complex-environnements/)

Assignment

In the scope of the above-mentioned projects, the objectives are to further develop, optimize, expand and deploy our embedded perception and navigation systems for autonomous mobile vehicles, with an emphasis on real world experiments on two main robotic platforms : an automated Renault Zoe vehicle and the Barakuda robotic platform from Shark Robotics. Many evolutions are to be developed, such as probabilistic models for new sensors and methods, smart dynamic occupancy grid compression and communication, semantic analysis and reasoning by combining the current Dynamic Occupancy Grid approaches with Deep Learning, or hardware-specific adaptations for new embedded device architectures. The Mobilex challenge just starting, the Barakuda is to be equipped, the whole autonomy solution to be adapted and tested in complex and unstructed environments.

The recruited engineer will work within a team of engineers already working on the projects, in interaction with PhD students and researchers of the Chroma team. He should reinforce the existing skills of the engineering team, bringing or developping expertise in :
- Perception (using camera, LIDAR, radar, stereo camera or others), data fusion, control, trajectory planning and navigation in dynamic environments

- Bayesian modeling and programming, probabilistic robotics
- Software architecture and development for robotics (ROS), with real-time contraints on embedded devices (Nvidia Jetson)
- Parallel computing (CUDA)
The recruited engineer will also contribute to the improvement of the experimental platforms and can get involved in scientific publications, international conferences or various demonstrations.

Main activities

Depending on the profile, the activities of the recruited engineer will consist in :

- Developing perception software on embedded parallel architectures (Nvidia Jetson and other GPUs).
- Developing experimental platforms, test and integrate new sensors (stereo camera, radar or others).
- Proposing and developping new methods and algorithms, and integrating them into the current framework.
- Writing documentation, reports, and participating in scientific paper writting.
- Running tests using simulation tools and experimental plateforms.
- Participating in presentations and demonstrations with the automated vehicle in industry or research events.

Skills

- Engineer with R&D experience or PhD in Computer Science, Robotics or closely related fields.
- Good theoretical and practical background in one of the following domains: Probabilistic Robotics, Multi-sensors Perception, Scene Understanding, Parallel computing, Deep Learning and/or Decision-making for safe navigation.

The following qualifications would be an advantage:

- Experience using the Robotics library ROS
- Good skills in C/C++.
- Familiarity with CUDA and Boost libraries, or FPGAs
- Good skills in Linux, system management.
- Theoretical and practical knowledge of Bayesian models and programming
- Experience on Deep Learning, Pytorch
- Ability to work as a teammate with other researchers
- French and English skills (written and spoken)

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

Remuneration

From 2,692 € (depending on experience and qualifications).

General Information

- **Theme/Domain :** Robotics and Smart environments
  Software Experimental platforms (BAP E)
- **Town/city :** Montbonnot
- **Inria Center :** Centre Inria de Lyon
- **Starting date :** 2025-02-01
- **Duration of contract :** 11 months
- **Deadline to apply :** 2025-01-01

Contacts

- **Inria Team :** CHROMA
- **Recruiter :**
  Rummelhard Lukas / lukas.rummelhard@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 via the Inria website. Processing of applications submitted via other channels is not guaranteed.

Defence security:

This position is likely to be assigned to a restricted area (ZRR), as defined in decree no. 2011-1425 relating to the protection of the nation's scientific and technical potential (PPST). Authorisation to access a zone is issued by the head of the establishment, following a favourable ministerial opinion, as defined in the decree of 03 July 2012 relating to the PPST. An unfavourable ministerial opinion for a post assigned to a ZRR would result in the recruitment being cancelled.

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.