



Offre n°2023-06636

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

Type de contrat : Fixed-term contract

Contrat renouvelable : Oui

Niveau de diplôme exigé : Graduate degree or equivalent

Fonction : Temporary scientific engineer

Corps d'accueil : Ingénieur d'Etudes (IE)

A propos du centre ou de la direction fonctionnelle

The Inria research centre in Lyon is the 9th Inria research centre, formally created in January 2022. It brings together approximately 300 people in 16 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.

Contexte et atouts du poste

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 platforms, 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-mobility-in-complex-environments/>)

Mission confiée

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 unstructured 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 developing 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 constraints 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.

Principales activités

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 developing new methods and algorithms, and integrating them into the current framework.
- Writing documentation, reports, and participating in scientific paper writing.
- Running tests using simulation tools and experimental platforms.
- Participating in presentations and demonstrations with the automated vehicle in industry or research events.

Compétences

- 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)

Avantages

- 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

Rémunération

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

Informations générales

- **Thème/Domaine** : Robotics and Smart environments
Software Experimental platforms (BAP E)
- **Ville** : Montbonnot
- **Centre Inria** : [Centre Inria de Lyon](#)
- **Date de prise de fonction souhaitée** : 2024-05-01
- **Durée de contrat** : 12 months
- **Date limite pour postuler** : 2024-04-29

Contacts

- **Équipe Inria** : [CHROMA](#)
- **Recruteur** :
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A propos d'Inria

Inria est l'institut national de recherche dédié aux sciences et technologies du numérique. Il emploie

2600 personnes. Ses 215 équipes-projets agiles, en général communes avec des partenaires académiques, impliquent plus de 3900 scientifiques pour relever les défis du numérique, souvent à l'interface d'autres disciplines. L'institut fait appel à de nombreux talents dans plus d'une quarantaine de métiers différents. 900 personnels d'appui à la recherche et à l'innovation contribuent à faire émerger et grandir des projets scientifiques ou entrepreneuriaux qui impactent le monde. Inria travaille avec de nombreuses entreprises et a accompagné la création de plus de 200 start-up. L'institut s'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

Attention: Les candidatures doivent être déposées en ligne sur le site Inria. Le traitement des candidatures adressées par d'autres canaux n'est pas garanti.

Consignes pour postuler

Sécurité défense :

Ce poste est susceptible d'être affecté dans une zone à régime restrictif (ZRR), telle que définie dans le décret n°2011-1425 relatif à la protection du potentiel scientifique et technique de la nation (PPST). L'autorisation d'accès à une zone est délivrée par le chef d'établissement, après avis ministériel favorable, tel que défini dans l'arrêté du 03 juillet 2012, relatif à la PPST. Un avis ministériel défavorable pour un poste affecté dans une ZRR aurait pour conséquence l'annulation du recrutement.

Politique de recrutement :

Dans le cadre de sa politique diversité, tous les postes Inria sont accessibles aux personnes en situation de handicap.