



Offer #2025-08896

Development of an end-to-end differentiable robot motion control architecture

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

Assignment

This assignment is part of the OSS4EAI (open source software for embodied AI) project. OSS4EAI explores the design of end-to-end differentiable learning architectures. It revisits fundamental algorithms in robotics, particularly for physical simulation, and extends them to automate the transfer to real robots where data is sparse. This approach will be implemented in maintained open-source software to accelerate the learning of robotic behaviors and propose new forms of data and model sharing.

Main activities

Your goal will be to develop a motion learning pipeline for manipulation and locomotion using the [Simple](#) differentiable simulator developed in OSS4EAI, comparing the resulting pipeline with standard reinforcement learning. Here is a more detailed breakdown of the tasks involved:

- Learn how to use the existing [reinforcement learning baseline](#) on [Upkie](#) wheeled-biped robots
- Interface Simple as a forward-dynamics simulator in the Upkie software, and evaluate its performance
 - Implement a rolling-without-slipping constraint in C++, in close collaboration with simulator developers
 - Document the performance comparison on the project website
- Implement a policy learning pipeline using Simple as a differentiable simulator
 - The algorithmic layout will be specified with researchers actively working in the project

- Compare the performance of learned policies on the real robot

Based on the results of this first phase, the project can be extended to a second year where we will extend the pipeline to a broader range of robot tasks (*e.g.* humanoid locomotion).

Skills

Candidates should hold either a PhD degree in robotics or an MSc degree with more than five years of experience in the robotics industry.

Required skills:

- Experience in running live code on real robots
- Knowledge in robotics modeling: kinematics, dynamics, Jacobian matrices, ...
- Programming skills in C++ and Python
- Spoken and written technical English

Other skills that will be appreciated:

- Experience in model predictive control or reinforcement learning
- Programming skills in PyTorch

Although the project requires a strong background in robotics and software engineering, prior knowledge of reinforcement learning is not a pre-requisite as things can be learnt on the go with existing software and support from the team.

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 (after 6 months of employment) 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

General Information

- **Theme/Domain** : Robotics and Smart environments
Scientific computing (BAP E)
- **Town/city** : Paris
- **Inria Center** : [Centre Inria de Paris](#)
- **Starting date** : 2025-07-01

- **Duration of contract** : 12 months
- **Deadline to apply** : 2025-08-31

Contacts

- **Inria Team** : [WILLOW](#)
- **Recruiter** :
Caron Stephane / stephane.caron@inria.fr

About Inria

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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.