Offre n°2025-08659

Internship (M/F): synthetizing expressive motions on a biped robot

Le descriptif de l'offre ci-dessous est en Anglais

Niveau de diplôme exigé : Bac + 4 ou équivalent

Fonction : Stagiaire de la recherche

Contexte et atouts du poste

The position is funded by the PEPR O2R, a national French program to advance research in robotics which reunites several French laboratories in robotics, AI, and Social and Human Sciences, and the ANR project OSTENSIVE, focused on generating motions that convey the purpose of an action in a natural and expressive way. In this context, the HUCEBOT team is involved in designing robot motions that are expressive and facilitate the communication.

About the team:

The candidate will join the Human Centered Robotics team (HUCEBOT) in the Inria Center of the University of Lorraine in Nancy, France.

The team HUCEBOT develops control, learning, and interaction skills of human-centered robots, such as humanoid, mobile manipulators and exoskeletons. The team develops learning and control algorithms for teleoperated / supervised / autonomous robots, involved in complex manipulation tasks in man-made environments. It also develops prediction and control techniques for wearable exoskeletons designed to assist humans at work. The team has excellent robotics facilities, including several humanoid robots (Talos, iCub, G1), manipulators, drones, passive and active exoskeletons, wearable sensors, force plates etc. Its laboratory has a 3D printing facility and a mechatronic workshop for prototyping and maintenance.

The team consists of many research scientists, postdocs, PhD and has the support of 1 software and 1 mechatronics engineer. The team is international - English and

French speaking. French is not required, although free French classes are available in the institute for non-French speakers.

About the laboratory and Nancy:

The Inria Center of the University of Lorraine, is co-located with the Loria laboratory, in the Science and Technology Campus of the University of Lorraine (Nancy, France), next to the Botanical Gardens, at 20 minutes by public transportation or bike from the Nancy train station and City Center. Several student residences and facilities are at walking distance. Nancy is a University town, with a high quality of life and a vibrant student and expat community.

Mission confiée

The internship is about the design of expressive motions for a small biped robot. The intern will collaborate with the engineers of the team to build a biped robot inspired by the BDX droid by Disney, based on the Open Duck robot project (https://github.com/apirrone/Open_Duck_Mini). To generate the motions, we will pproceed in two steps: first, we will replicate the work of Disney (https://la.disneyresearch.com/wp-content/uploads/BD_X_paper.pdf) using reinforcement learning from several simulated behaviors; then, we will adopt a different strategy and will apply MAP-elite to generate behaviors exhibiting quality diversity of expressive metrics.

The internship is for a period of 3 to 6 months (6 months ideally). For Master students, there is a possibility to continue the research as a PhD student in the project OSTENSIVE.

Principales activités

- Review state of the art in expressive and ostensive motion generation
- Collaborate with team to finalize the building of the mini biped robot
- Implement the paper of Disney Research to find the animated behaviors of the robot in simulation.
- Generate expressive behaviors in simulation with Quality Diversity; transfer with one shot.
- Test generated behaviors on the real robot.
- Write report
- Collaborate with the team to communicate on the current experiments and developments

Compétences

- Technical skills:
  - Very good programming skills (python, C++).
  - Background in robotics, or Ability to understand mechatronics.
  - Excellent skills and/or experience with reinforcement learning, optimization, numerical optimization, and/or generative AI models.
- Soft skills:
  - Excellent communication skills at work, and ability to report progress
  - Proactivity.
  - Not afraid of challenging projects.
  - Rigour and intellectual honesty
  - Curiosity and desire to learn
  - Practical mindset and ability to develop robust and reliable solutions
  - Autonomy and organizational skills
  - Love working in a multi-cultural environment
  - Team player

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 (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

Rémunération

€4.35/hour

Informations générales

- **Thème/Domaine :** Robotique et environnements intelligents
  Ingénierie logicielle (BAP E)
- **Ville :** Villers lès Nancy
- **Centre Inria :** Centre Inria de l'Université de Lorraine
- **Date de prise de fonction souhaitée :** 2025-04-01
- **Durée de contrat :** 6 mois

- **Date limite pour postuler :** 2025-03-14

Contacts

- **Équipe Inria :** LARSEN
- **Recruteur :**
  Ivaldi Serena / serena.ivaldi@inria.fr

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'e?orce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

Bachelor Degree or Master Degree studies in Computer Science, Robotics, Engineering or AI.
Excellent communication in English' French is a plus.

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.