Offre n°2024-07119

Post-Doctoral Research Visit F/M Deep generative approaches for personalized training in virtual reality

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

Type de contrat : CDD

Niveau de diplôme exigé : Thèse ou équivalent

Fonction : Post-Doctorant

Contexte et atouts du poste

This postdoc is situated in the context of ANR CREATITIVE3D, a French state-funded project that deploys virtual reality headsets (VR) to study navigation behaviors in complex environments, and the impact of low-vision conditions. It involves partners in computer science and neuroscience from the Université Côte d'Azur (I3S, CHU Nice, LAMHESS) as well as the LPC lab of Aix-Marseille Université. The postdoc project will be entirely carried out in the Biovision team of Inria Center at Université Côte d'Azur.

Mission confiée

Context: When using virtual reality for real-life applications such as rehabilitation and training, cognitive and behavioral measures are put in place to better understand the user experience and evaluate the effectiveness of these applications. Questionnaires are a popular tool to measure the sense of presence [Sla99], emotion [BBC04], and broader user experience components including immersion and engagement [TLC16], which have been notably been adopted by Jicol et al. [JWD21] to investigate the interplay between agency, presence, and emotion with the use of structural equation models. Our recent work combining the use of physiological sensors and gaze tracking [GRB22] investigated correlations between attention, emotion, and content saliency when viewing 360 videos in VR.

The project has completed a large-scale study of walking in VR with simulated low-vision conditions with multimodal data collection (gaze, motion, and physiology), resulting in open dataset, software, and AI modeling baselines [RWS23, WRG24, GWS24]. We are currently in the phase of re-iterating the study in a clinical setting at the Institut Claude Pompidou, Nice, with patients of low vision and other neuro-degenerative conditions.

Assignment: In line with the clinical studies, the postdoc will integrate into a multi-disciplinary team to investigate AI approaches for personalized training protocols in VR adapted to each patient's needs. Specifically, the research the postdoc will tackle involves:

1. What is the impact of low vision and neuro-degenerative conditions on 6 degrees of freedom navigation in VR? We tackle this question through AI modelling of clinical data on tasks such as classification of disease markers, and multimodal prediction on gaze and physiological responses.
2. State of the art and initial investigation into generative AI approaches for 3D training scenario generation, personalized to user profiles, specifically for use in clinical settings.

References :

ANR CREATITIVE3D project site: https://project.inria.fr/creattive3d/

Biovision team website: https://team.inria.fr/biovision/


Principales activités

Main activities:

- Proposing, implementing, and evaluating methods for multimodal data modeling from the clinical study
- Conducting an in-depth state of the art and establishing baselines of generative AI for 3D content targeted for clinical rehabilitation/training
- Participating and presenting at regular research meetings with partners, as well as relevant scientific and outreach seminars
- Publishing research results through scientific journals and conferences

Additional activities:

- Research-related teaching activities such as supervising master student projects

Compétences

Technical skills and level required: We expect a good level of programming in Python and at least one other language of choice with which you would be comfortable:

- implementing well-know algorithms (e.g., search and sort) and data structures (e.g., lists, trees, graphs)
- importing, exporting, and processing files containing data (e.g., json, csv) or other content (e.g., text, image)
- describing the common libraries used for your domain of expertise

Languages: a good level of English reading, writing, and speaking is required. By good, we expect previous examples of written documentation and scientific papers in English.

Relational skills: Regular communication of progress, results, and difficulties is absolutely necessary

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

Informations générales

- Thème/Domaine: Représentation et traitement des données et des connaissances
- Calcul Scientifique (BAP E)
- Ville: Sophia Antipolis
- Centre Inria: Centre Inria d'Université Côte d'Azur
- Date de prise de fonction souhaitée: 2024-10-01
- Durée de contrat: 1 an, 6 mois
- Date limite pour postuler: 2024-06-16

Contacts
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.

L'essentiel pour réussir

- **Domain knowledge and motivation**: we seek candidates with strong competences in modern deep learning paradigms, tools, and libraries, and strong interest in cognitive science or neuroscience. We particularly appreciate any knowledge, coursework, and prior projects in visual perception, action, and/or emotion.
- **Willingness to learn**: this is a multidisciplinary project, and you will likely be learning about a whole new domain of knowledge (generative AI, cognitive science, and/or virtual 3D environments)
- **Proactiveness**: you will be joining the project in the middle of its term, with multiple branches of activities going on, some of which you will be participating in and/or continuing. Actively asking questions and participating in activities of the research team will help you better identify the scope of your postdoc project.
- **Adaptability**: Research involves uncertainty. Technologies and approaches nowadays are evolving at unprecedented speeds, notably in AI. You will need to stay up to date with current advances in the field, and be willing to adapt the research project direction.
- **Rigor**: This project involves interactions in a clinical setting as well as clinical data. Strict observation of ethical protocols for data processing, analysis, and storage are absolutely necessary.

All applications must include:

- CV with education, experience, and publications
- A motivation letter detailing your profile in relation to this post and your long-term career plans
- A writing sample (publication or report)
- A recommendation letter is appreciated but not required

**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.