Offre n°2024-07798

Post-Doctoral Research Visit F/M Building a benchmark for sketch-based modeling

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

Type de contrat : CDD

Niveau de diplôme exigé : Thèse ou équivalent

Fonction : Post-Doctorant

Niveau d'expérience souhaité : Jeune diplômé

A propos du centre ou de la direction fonctionnelle

The Inria centre at Université Côte d'Azur includes 42 research teams and 9 support services. The center's staff (about 500 people) is made up of scientists of different nationalities, engineers, technicians and administrative staff. The teams are mainly located on the university campuses of Sophia Antipolis and Nice as well as Montpellier, in close collaboration with research and higher education laboratories and establishments (Université Côte d'Azur, CNRS, INRAE, INSERM ...), but also with the regional economic players.

With a presence in the fields of computational neuroscience and biology, data science and modeling, software engineering and certification, as well as collaborative robotics, the Inria Centre at Université Côte d'Azur is a major player in terms of scientific excellence through its results and collaborations at both European and international levels.

Contexte et atouts du poste

Computer Aided Design (CAD) is a multi-billion dollar industry responsible for the digital design of almost all manufactured goods. It leverages parametric modeling, which allows dimensions of a design to be changed, facilitating physically-based optimization and design remixing by non-experts. But CAD's potential is diminished by the difficulty of creating parametric models: in addition to mastering design principles, professionals must learn complex CAD software interfaces.

To promote effective modeling strategies and creative flow, design educators advocate freehand drawing as a preliminary step to parametric modeling. The goal of our research is to convert freehand drawings into parametric CAD models that can be reused in downstream applications. To inform this research, we aim at creating a benchmark of design drawings and corresponding CAD models.

Mission confiée

Before converting design drawings into CAD models, we must first understand how designers create such drawings. What lines do they draw? How do these lines relate to the intended CAD model? How accurate is the perspective projection in a typical drawing? To answer these questions, we will collect professional drawings and their corresponding CAD models.

Our work focuses on concept sketches that designers draw to explain a shape they have in mind. Designers create these sketches following long-standing principles of perspective drawing, e.g. they employ intermediate construction lines for perspective accuracy. Based on our experience in collecting such drawings [1], we will capture the construction sequence of each drawing using a pen tablet, such that each pen stroke is represented by a polyline with pen pressure and a time stamp. We will complement these drawings with CAD programs representing the same shapes.

[1] OpenSketch: A Richly-Annotated Dataset of Product Design Sketches
Yulia Gryaditskaya, Mark Sypesteyn, Jan Willem Hoftijzer, Sylvia Pont, Frédo Durand, Adrien Bousseau
ACM Transactions on Graphics (SIGGRAPH Asia Conference Proceedings) 2019

Principales activités

Thanks to cloud-based CAD modeling tools, curated datasets of CAD models have been made public. We will select a set of high-quality models from these datasets. We will gather models with a wide range of complexity, as measured by the number and diversity of CAD operations used. We will then hire professional designers to draw these CAD shapes.

Next, we will align the two types of data, such that drawing strokes are put in correspondence with the

CAD instructions that generate the same shape parts. Such aligned data will allow us to study how different CAD operations are drawn and serve as a benchmark for algorithm that aims at segmenting and interpreting design drawings.

Finally, we will analyze the collected CAD and drawing sequences to inform the design of sketch-based modeling systems. In particular, we will measure statistics about how frequently different CAD operations and drawing techniques are used, as well as correlations between drawing techniques and CAD operations.

Compétences

Experience in implementing 3D user interfaces and/or geometry processing algorithms.

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 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
- Contribution to mutual insurance (subject to conditions)

Rémunération

Gross Salary: 2788 € per month

Informations générales

- **Thème/Domaine :** Interaction et visualisation
  Ingénierie logicielle (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 :** 2 ans
- **Date limite pour postuler :** 2024-07-23

Contacts

- **Équipe Inria :** GRAPHDECO
- **Recruteur :**
  Bousseau Adrien / Adrien.Bousseau@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'efforce ainsi de répondre aux enjeux de la transformation numérique de la science, de la société et de l'économie.

L'essentiel pour réussir

The candidate should have a Ph.D. in computer graphics or human-computer interaction, with an interest in geometry processing and machine learning. The candidate should also have an interest in developing tools for designers and in interacting with such expert users.

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.