Offer #2022-05436

PhD Position F/M Creative Visualization Sketching

Contract type : Fixed-term contract

Level of qualifications required : Graduate degree or equivalent

Fonction : PhD Position

About the research centre or Inria department

Located at the heart of the main national research and higher education cluster, member of the Université Paris Saclay, a major actor in the French Investments for the Future Programme (Idex, LabEx, IRT, Equipex) and partner of the main establishments present on the plateau, the centre is particularly active in three major areas: data and knowledge; safety, security and reliability; modelling, simulation and optimisation (with priority given to energy).

The 500 researchers and engineers from Inria and its partners who work in the research centre's 30 teams, the 60 research support staff members, the high-level equipment at their disposal (image walls, high-performance computing clusters, sensor networks), and the privileged relationships with prestigious industrial partners, all make Inria Saclay Île-de-France a key research centre in the local landscape and one that is oriented towards Europe and the world.

Context

The thesis is fully funded by Inria and theANR project GLACIS, which brings together experts from Human-Computer Interaction (HCI), Information Visualization, and Computer Graphics. There are opportunities for collaboration with Inria Sophia Antipolis (Computer Graphics), as well as Inria Bordeaux, the École Centrale de Lyon, and the University of Toronto (Visualization and HCI). We also foresee close interactions with design experts.

Assignment

Context

Professionals commonly switch between sketches on paper and computers to reach a new data visualization design [Landers and Heller, 2014]. Computer programs are powerful tools that allow professionals to generate solutions keeping a direct binding with the underlying data. But many expert designers first start by exploring visualization solutions through hand-drawn sketches. Before having access to the actual data, sketches enable them to *"visualize the architecture of the infographics and cultivate ideas for shaping the data visually,"* while later, sketching with data can*"help raise new questions about the data itself"* [Lupi, 2015].

Unfortunately, dominant visualization systems target data-exploration and data-analysis tasks and fail to meet communication purposes [Kosara, 2016]. Previous studies [Bigelow, 2014] also suggest that current visualization tools impose a data-to-graphics workflow that hinders visual thinking. As a result, the process of creating an original infographic can be extremely manual, involving multiple tools that are largely disconnected from the underlying data. In contrast, we aim to address the more ambitious goal of computer-aided design that treats infographic creation as a visual-thinking process [Ware, 2008]. This process is driven by the graphics, starting from sketches, moving to flexible graphical structures that embed constraints, and ending with data and generative parametric instructions, which can then re-feed the designer's sketches and graphics.

Main activities

Objectives

The key objectives of the PhD thesis are as follows:

1. Devise a grammar of expressive visualization graphics that accommodate flexible and organic sketch-based representations.
2. Establish a set of sketching *operators* that can express representative workflows for constructing creative visualizations through sketching.
3. Design sketch-based user interface techniques for data illustrators or visualization designers that turn sketches into organic, generative elements of a design solution.

The work will build upon a very activate research on visualization authoring tools [Kim et al., 2017; Ren et al., 2019; Tsandilas, 2021], sketching user interfaces [Tsandilas et al., 2015, Xia et al., 2018], visualization

grammars [Satyanarayan, 2017], approaches for synthesizing diagrams [Ye et al., 2020], and shape grammars [Stiny, 2006].

References

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18. Ye, W. Ni, M. Krieger, D. Ma'ayan, J. Wise, J. Aldrich, J. Sunshine, and K. Crane. Penrose: from mathematical notation to beautiful diagrams. *ACM SIGGRAPH 39(4)*, Article 144, July 2020, 16 pages. **Website.**

Skills

The candidate is expected to have a Master degree (M2-level for the French system) and background in Human-Computer Interaction, Information Visualization, or Computer Graphics. The candidate must have good programming skills and be enthusiastic about conducting research in a topic that combines the above fields.

The PhD thesis will ideally start early in 2023. Do not hesitate tocontact me directly for additional information. To apply, please add your CV, a motivation letter, and any additional information that could make your application stand out: links to projects and interactive prototypes, or research reports (e.g., Master thesis or paper) that demonstrate your research experience.

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 :** Interaction and visualization
  Information system (BAP E)
- **Town/city :** Gif-sur-Yvette
- **Inria Center :** Centre Inria de Saclay
- **Starting date :** 2023-02-01
- **Duration of contract :** 3 years
- **Deadline to apply :** 2023-04-01

Contacts

- **Inria Team :** EX-SITU
- **PhD Supervisor :**
  Tsantilas Theofanis / Theophanis.Tsandilas@inria.fr

About Inria

Inria is the French national research institute dedicated to digital science and technology. It employs 2,600 people. Its 200 agile project teams, generally run jointly with academic partners, include more than 3,500 scientists and engineers working to meet the challenges of digital technology, often at the interface with other disciplines. The Institute also employs numerous talents in over forty different professions. 900 research support staff contribute to the preparation and development of scientific and entrepreneurial projects that have a worldwide impact.

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.