A propos du centre ou de la direction fonctionnelle

The Inria Bordeaux-Sud-Ouest centre is one of Inria's eight centres and has around twenty research teams. The Inria centre is a major and recognized player in the field of digital sciences. It is at the heart of a rich R&D and innovation ecosystem: highly innovative SMEs, large industrial groups, competitiveness clusters, research and higher education players, laboratories of excellence, technological research institutes...

Contexte et atouts du poste

Within the framework of a partnership public with the French National Research Agency (ANR).

Mission confiée

The overall goal of this PhD will be to develop novel techniques to manipulate sketchy drawings (a.k.a., roughs) and interpolate between them to produce 2D animations. The developed solution will rely on the degrees of freedom afforded by rough drawings, namely the less precise localization of strokes (they may even overlap). Moreover, we will not strive for temporal coherence at the stroke level, but rather synthesize stroke distributions that might “jitter” from frame to frame but still convey the intended motion. Multiple strokes might represent the same underlying curve, hence we will consider the grouping of strokes, adapting existing techniques to our context. The merging and separation of groups from keyframe to keyframe (i.e., topological changes) will be considered in a second time.

Principales activités

A first challenge will consist in identifying the curves implicitly formed by stroke groups in each keyframe. We thus need to identify these groups of strokes before any further processing. It would be unnatural for artists to specify such groups while they are drawing, as this could break their “creative flow”. Besides, rough drawings are often not drawn sequentially; each implicit curve is rather refined in turn by progressively adding new strokes. The first goal will thus be to develop a tool assisting the artist to segment a rough drawing into consistent groups of strokes once it is fully drawn. We want to investigate the possibility to combine existing techniques based on user-annotations, such as scribbles, with automatic MLS-based approaches.

The second goal will then be to estimate correspondences between such implicitly defined curves at successive frames. With a straight-ahead animation workflow this task should be easier since a global registration between two successive drawings is induced by the deformation used by the animator. Nevertheless, we still need to provide artists with deformation tools that guarantee a bijective mapping between drawings by construction, such that both sets of strokes can be transformed to the intermediate frames. Most computer-assisted 2D animation software offer such functionalities, but few of them allow local deformations and, if they do, their interface is limited to control points of regular grids. We want to investigate interaction metaphors that better fit into the drawing pipeline (e.g., brushes).

A third challenge will lie in the analysis of stroke distribution properties: how much they overlap, their density, looping, spreading apart, etc. Given such a parametric description, our aim will be to synthesize stroke distributions at intermediate frames, interpolating the distribution parameters from the same stroke group at different keyframes. Changes in topology will be dealt with by specific merging/separation events occurring at keyframes. Finally, we want to allow artists to control the dynamics of the animation between two keyframes, which mostly corresponds to the spacing of drawings. In traditional 2D animation, this is specified by the spacing charts either on the side or along the main trajectory of the drawing. Time permitting, the third goal of this internship will be to develop interaction metaphors inspired by these charts to edit spacing charts either on the side or along the main trajectory of the drawing. Time permitting, the third goal will be to develop interaction metaphors inspired by these charts to edit spacing charts either on the side or along the main trajectory of the drawing. Time permitting, the third goal of this internship will be to develop interaction metaphors inspired by these charts to edit spacing charts either on the side or along the main trajectory of the drawing. Time permitting, the third goal will be to develop interaction metaphors inspired by these charts to edit spacing charts either on the side or along the main trajectory of the drawing.
Rémunération

fix-term contract for 3 years:

The gross salary during the first and second year will be 1982 euros (before taxes)

The gross salary during the third year will be 2085 euros (before taxes).