Choreographic Style Transfer

Advisors: Rémi Ronfard and Mélina Skouras, IMAGINE team, INRIA, Univ. Grenoble Alpes, LJK.

Email: remi.ronfard@inria.fr, melina.skouras@inria.fr

Context: This Masters thesis is proposed as part of the Living Archive of Isadora Duncan project, a collaboration between Conservatoire National de la Danse, IMAGINE team at Inria Grenoble and Ex-Situ team at Inria Saclay. The thesis will take place in the IMAGINE team at INRIA in Montbonnot. It is offered to Masters students interested and trained in Computer Graphics.

Objectives:

The living archive of Isadora Duncan aims to constitute an archive of Isadora Duncan choreographies, by recording performances by several dancers who learned them from Isadora Duncan's students. Isadora Duncan herself refused to be filmed because she felt the frame rate of cinematography (24 fps) could not do justice to her choreographic style. Using a combination of high speed video and motion capture (120 fps), we would like to create an archive that effectively captures the style of Isadora Duncan's choreography and can serve as a foundation for future research and teaching.

The goal of the internship will be to design new methods for rendering the captured motions using the concept of line-of-action curves [1,2] which have been shown before to provide a useful abstraction to dancer movements, superior to the more traditional stick figures used in previous work [3,4]. More specifically, we would like to create a novel representation of the dancer's movements, in the shape of deformable ribbons originating from the dancer's chest and ending in the dancer's head, feet and hands. We will need to find a suitable ribbon representation, e.g. based on the discrete elastic rod model [5]. We will also need to work out the mathematical details of the ribbon dynamics and compute the ribbon motions from a set of markers placed on the dancer's body. We will demonstrate the results with an immersive VR application allowing to visualize the ribbon motions and control their execution in real-time (play, pause, rewind and slow motion) with the highest possible quality.

If successful, the master's thesis is expected to lead to a Phd thesis on transferring the choreographic style of Isadora Duncan to physical animations of fluids (water, smoke), clothes and sculptures.

References:

1. Martin Guay, Marie-Paule Cani, Rémi Ronfard. The Line of Action: an Intuitive Interface for Expressive Character Posing. ACM Transactions on Graphics, Association for Computing Machinery, 2013, Proceedings of ACM SIGGRAPH Asia 2013.
2. Martin Guay, Rémi Ronfard, Michael Gleicher, Marie-Paule Cani. Space-time sketching of character animation. ACM Transactions on Graphics, Association for Computing Machinery, 2015, Proceedings of ACM SIGGRAPH 2015.
3. Lars Wilke, Tom Calvert, Rhonda Ryman, Ilene Fox. Animating the Dance Archives. VAST 2003.
4. Tom Calvert, Lars Wilke, Rhonda Ryman, and Ilene Fox. Applications of Computers to Dance. IEEE Computer Graphics and Applications, vol. 25, no. 2, March 2005.
5. Miklós Bergou, Max Wardetzky, Stephen Robinson, Basile Audoly and Eitan Grinspun. Discrete Elastic Rods. ACM Transactions on Graphics, vol. 26, issue 3, 2008.