CALL FOR PHD CANDIDATES
Starting Date: October 2018

HETEROGENEOUS DATA FUSION FOR SAFEGUARDING OF CULTURAL HERITAGE OF DANCE

Context

The PhD is part of a European project under the call JPICH. The "SCHEDAR" project is a collaborative project between several European partners, including University of Cyprus (leader), Algolysis Ltd in Cyprus, Warwick University in UK, University Rennes 2 (Inria MimeTIC team), and University of Reims Champagne Ardennes (URCA - CReSTIC lab. in the RVM team). SCHEDAR aims at capturing, preserving and subsequently re-creating intangible Cultural Heritage in dance using new technologies.

PhD Objectives

In this PhD, we will explore the capability of creating robust reconstruction of dynamic capture of dancers. Difficulties are manifold. Unlike many other types of input, it will be difficult to automatically map a skeleton because of large moving garments. Moreover, contact and accessories might infer additional difficulties. One main challenge is to capture the motion of dancers in uncontrolled ecological situation, with occlusions, complex motions, garments, etc. In this thesis, we will explore the adequate approaches for building an animated 3D mesh of the dancer from fusion of several heterogeneous data, including depth images, RGB images, and prior knowledge. Several methods could be used to build reliable human poses based on this data, including machine learning, uncertainty, 3D vision, and mathematical models. The main idea of this PhD is to take advantage of these methods to propose a new approach.

The PhD will take place at URCA in Reims, with some stays in Rennes. It will be co-supervised by Prof. Céline Loscos at URCA, Prof. Franck Multon in Rennes, and Dr. Eric Desjardin at URCA. Both teams have extensive expertise in motion capture, animation, 3D vision and 4D modelling. They beneficiate from exceptional equipment that will be available in the project, with a preferential access to a motion capture studio set in Rennes 2 and to ROMEO HPC facilities at URCA.

Candidate profile

The PhD candidate should hold a master's degree in computer science. Very good background in computer graphics, 3D vision, and/or machine learning are expected. A good English level is preferable in order to facilitate collaborative work with partners abroad. The candidate will be co-supervised by Céline Loscos at URCA and Franck Multon at UR2-Inria.

Application

Inquiries can be addressed to celine.loscos@univ-reims.fr and franck.multon@irisa.fr.

References

[Ismael 18] M. Ismael, R. Ramirez Orozco, C. Loscos, S. Prevost, Y. Rémion (2018). *Actor 3D reconstruction by a scene-based, visual hull guided, multi-stereovision framework*. 26th International Conference in Central European Computer Graphics, Visualization and Computer Vision2018, May 2018, Plzen, Czech Republic.

[Plantard 17] P Plantard, HPH Shum, F Multon (2017) *Filtered pose graph for efficient kinect pose reconstruction. Multimedia Tools and Applications* 76 (3), 4291-4312.

[Blache 16] L Blache, C Loscos, L Lucas (2016) *Robust motion flow for mesh tracking of freely moving actors*, The Visual Computer 32 (2), 205-216

[Blache 15] L Blache, M Desbrun, C Loscos, L Lucas (2015), *Time-Varying Surface Reconstruction of an Actor's Performance*, International Symposium on Visual Computing, 92-101