

LA JOURNEE SCIENTIFIQUE LIMA2

31 Janvier 2013

La journée scientifique régionale du projet LIMA2 (Loisir et Images) aura lieu le 31 janvier 2013 à Lyon (Campus de la Doua, amphithéâtre de Polytech). Cette journée est financée par l'ARC6 de la région Rhône-Alpes et soutenue par le pôle Imaginove.

Elle est ouverte à tous les chercheurs et doctorants de la région intéressés par le domaine de l'image et de la vidéo numérique (analyse, traitement, informatique graphique,..). La participation est gratuite et les frais de déplacement au sein de la région seront pris en charge par le projet LIMA2.

Programme

9h00	Accueil
9h30-10h30	Julie Digne (LIRIS-Géomod) High resolution point clouds : how to process them?
10h30-11h30	Thibaut Weise (EPFL, Faceshift) Realtime facial performance capture for animation and gameplay
11h30-11h45	Pause
11h45-12h00	Informations sur les ARCs (Patrick Lambert)
12h00-12h15	Présentation des posters
12h15-14h00	Repas buffet + Posters des doctorants
14h00-15h00	Adrien Gaidon (LJK- Lear/INRIA) Structured Models for Action Recognition in Real-world Videos
15h00-16h00	François Faure (LJK- Imagine/INRIA) Easy Mechanical Simulation using Frame-based Meshless Deformation.
16h00-16h15	Pause
16h15-16h45	Informations Imaginove (David Gal Régnier)
16h45-17h15	Conclusion de la journée, discussion sur les prochains événements

9h30-10h30 **Julie Digne (LIRIS-Géomod)** High resolution point clouds : how to process them?

Over the recent years, the quality of 3d surface acquisition devices has increased dramatically. Using standard reconstruction techniques with these high-resolution point clouds, the final reconstructed surface is usually smoothed, and the small details and textures captured by the scanner are lost. In this talk, we will describe a new framework for processing this type of data.

By analyzing the asymptotic behavior of several projection operators, we introduce a very simple projection operator that is consistent with the mean curvature motion. This operator allows for the extension of a well known 2D image analysis theory, scale spaces, to 3D point clouds. In this unified framework a lot of various problems can be solved: point set orientation, surface mesh reconstruction, scan merging and mesh segmentation for high precision data.

10h30-11h30 **Thibaut Weise (EPFL, Faceshift)** Realtime facial performance capture for animation and gameplay

In this talk we will discuss the challenges of facial performance capture, and how with the advent of commercially available 3D cameras such as the Microsoft Kinect real-time facial tracking and animation has become possible. I will present the algorithms that are necessary to achieve accurate tracking and animation despite the noisy and low-resolution data of the cameras. The second part of the talk will be about how we took our developed technology to found our spin-off faceshift, show a demo of our professional animation tool, and talk briefly about the SDK that will be release in 2013.

14h00-15h00 **Adrien Gaidon (LJK- Lear/INRIA)** Structured Models for Action Recognition in Real-world Videos

During this presentation, I will present some of the results of my PhD thesis, namely novel models to recognize broad action categories --- like "opening a door" and "running" --- in real-world video data such as movies and internet videos. In particular, we investigate how an action can be decomposed, what is its discriminative structure, and how to use this information to accurately represent video content. The main challenge we address lies in how to build models of actions that are simultaneously information-rich --- in order to correctly differentiate between different action categories --- and robust to the large variations in actors, actions, and videos present in real-world data.

Our approach consists in organizing collections of robust local features into structured action representations, for which we propose efficient kernels. We conducted thorough experiments on real-world videos from challenging benchmarks used by the action recognition community. We show that our methods outperform the related state of the art, thus highlighting that using structure information allows for more accurate and robust action recognition in real-world videos.

15h00-16h00 **François Faure (LJK- Imagine/INRIA)** Easy Mechanical Simulation using Frame-based Meshless Deformation.

A new method to simulate deformable objects with heterogeneous material properties and complex geometries using an arbitrary number of control frames is presented. Given a volumetric map of the material properties of an object and a number of control nodes, a distribution of the nodes is computed automatically, as well as the associated shape functions. Reference frames are attached to the nodes, and deformations are applied to the object using linear blend skinning. A continuum mechanics formulation is derived from the displacements and the material properties. We introduce novel material-aware shape functions in place of the traditional radial basis functions used in meshless frameworks. These allow coarse deformation functions to very efficiently resolve non-uniform stiffnesses. Complex models can thus be simulated at high frame rates using a small number of control nodes. We present applications to physical simulation and image registration.