Mis en place et soutenu par Région RhôneAlpes

CLUSTERS DE RECHERCHE RHÔNE-ALPES

Journée scientifique LIMA
11 juillet 2011 – Lyon

Amphithéatre de la bibliothèque de la Doua

- Plan du campus de la doua - cliquez ici
(zoom sur partie gauche du plan, chercher la Bibliothèque)
- Accès TCL : Tramway T 1 : arrêt la Doua Gaston Berger
Bus 38 ou 69 : arrêt la Doua.
- Accès voiture **:** Parking du campus en accès libre

9h30-10h30

Bob SUMNER, Disney Research, Zürich
Disney Research and Innovation in Entertainment

10h30-10h50 : Pause Café

10h50-11h50

Frédéric PRECIOSO ETIS Cergy-Pontoise / LIP6 Paris
Content-based Video Object Semantic Categorization: Actor retrieval and recognition in real movies

11h50-12h20

Vincent GIRONDEL GIPSA Lab Grenoble
Reconnaissance d'émotions dansées en vision par ordinateur dans le cadre d'un ballet en réalité augmentée (Projet ANR *CARE*)

12h20-13h40 : Buffet

13h40-14h40

Daniel MENEVEAUX XLIM - SIC Poitiers
Méthodes et problèmes liés à la simulation d'éclairage : principales familles d'algorithmes existants et difficultés/avantages/inconvénients.

14h40-15h40

Nicolas BONNEEL INRIA Nancy
Virtual Environments and Interpolation

15h40-16h00 : Pause Café

16h00-17h00

Frederic DEVERNEY INRIA Grenoble
The geometry of stereoscopic 3D cinema: issues and research directions

17h00-17h30

Lucian STANCULESCU LIRIS Lyon / LJK Grenoble
Freestyle, sculpting meshes with topology changes

Résumés des interventions

9h30-10h30

Bob SUMNER, Disney Research, Zürich
Disney Research and Innovation in Entertainment

Disney Research Zurich (DRZ) is an industrial research lab that works in close cooperation with ETH Zurich to invent new technology for Disney's many entertainment businesses. Founded in 2008, DRZ has over 40 researchers working on more than 70 distinct research projects in the fields of graphics, computer animation, facial modeling, video processing, stereo 3D, computational materials, and wireless communication. In this talk, I will highlight the fundamental importance of research in entertainment and discuss the design of DRZ. I will then present a collection of recent research results from our laboratory, including topics in animation, facial modeling, and video processing.

10h50-11h50

Frédéric PRECIOSO ETIS Cergy-Pontoise / LIP6 Paris
Content-based Video Object Semantic Categorization: Actor retrieval and recognition in real movies

Nowadays, providing the user with a system for searching into very large image databases becomes a critical issue of Content-Based Image and Video Retrieval systems (CBIVR). However, bridging the semantic gap between which (semantic) concept(s) the user is looking for and the (digital) content of data is quite difficult. We define new visual data representation and design a (kernel) similarity function on this representation in order to provide a video object retrieval system based on a kernel-based SVM.
From media data such as videos or movies, sequences are partitioned into shots and using state-of-the-art image object detection algorithms (for faces or cars, for example), we extract object in each image of each shot and define the regions containing this object (e.g. faces of a person, a car model, etc.). In these 2D+t object region track, we extract visual features spatio-temporally consistent using our optimized algorithm of SIFT point tracking. Each set of tracked SIFT descriptors defines then a "Chain of SIFTs". All the chains of tracked SIFT descriptors extracted from a video-track are gathered and form a new video object representation, that we call "Spatio-Temporal Tube". This data representation is not based on ad-hoc feature / model learning of a video object (e.g. face), but provides a generic and adaptive representation to any semantic video object.
To compare these complex tube objects, we design a Spatio-Temporal Tube Kernel (STTK) similarity function. Based on this kernel similarity we present both supervised and active learning strategies embedded in Support Vector Machine framework. Additionally, we propose a multi-class classification framework dealing with highly unbalanced datasets. Our approach is successfully evaluated on two real movies databases, the French movie "L'esquive" and episodes from "Buffy, the Vampire Slayer" TV series. Our method is also tested on a car database (from real movies) and shows promising results for car identification task and thus extension to any category of video objects.
We will eventually discuss of possible extensions to actions recognition and retrieval.

11h50-12h20

Vincent GIRONDEL GIPSA Lab Grenoble
Reconnaissance d'émotions dansées en vision par ordinateur dans le cadre d'un ballet en réalité augmentée (Projet ANR *CARE*)

Dans le cadre du projet ANR *CARE* (*Cultural experience : Augmented Reality and Emotion*), nous cherchons à reconnaître les émotions véhiculées par un danseur en vision par ordinateur. Les émotions considérées sont la joie, la peur, le dégoût, la tristesse, la surprise (positive/négative) et la colère (chaude/froide). Nous utilisons un système temps-réel d'analyse et d'interprétation du mouvement humain. Après l'acquisition vidéo, ce système commence par extraire la région d'intérêt (le danseur) de la scène grâce à une méthode basée sur la soustraction de fond (**segmentation**). Ensuite, les masques de segmentation obtenus sont mis en correspondance grâce à une méthode de suivi basée sur une intersection de boîtes englobantes (**suivi temporel**). Un certain nombre de paramètres et de caractéristiques du mouvement sont alors calculés (**analyse du mouvement**); par exemple, les *SMI* (*Silhouette Motion Images*) et la quantité de mouvement (*QoM* : *Quantity of Motion*) permettent de découper l'émotion dansée en phases de pause et de mouvement. Lors d'une phase de mouvement, nous accumulons certaines de ces caractéristiques de façon statistique (moyenne, écart-type) afin de la caractériser. Les résultats des différentes phases de mouvement sont alors combinés grâce à une analyse en composantes principales de façon pondérée et interprétées par rapport à un mélange de gaussiennes issu d'une étude menée sur des séquences d'apprentissage (**interprétation du mouvement**). Il est ainsi possible de reconnaître une émotion dansée par une analyse et une interprétation du mouvement réalisées en vision par ordinateur.

13h40-14h40

Daniel MENEVEAUX XLIM - SIC Poitiers
Méthodes et problèmes liés à la simulation d'éclairage : principales familles d'algorithmes existants et difficultés/avantages/inconvénients.

Cet exposé a pour objectif de présenter les questions principales - et quelques réponses existantes - pour le rendu photo-réaliste en image de synthèse. Alors que les pionniers du domaine ont proposé des modèles et algorithmes empiriques pour réaliser des effets visuels très attractifs, de nombreuses études plus récentes sont fondées sur les principes physiques des échanges lumineux à l'intérieur d'un environnement virtuel. Je montrerai dans cet exposé à la fois les aspects intuitifs de la simulation d'éclairage, et les avantages / défauts des grandes familles de méthodes par rapport aux aspects physiques.

14h40-15h40

Nicolas BONNEEL INRIA Nancy
Virtual Environments and Interpolation

This talk will be divided into two parts.
In the first part, we will first notice that 3D natural scenes are among the most difficult to create and render. I will propose a method based on texture synthesis allowing the rapid creation of such natural scenes. The user first creates a rough 3D sketch in few seconds, and provides an input segmented photograph which will serve as a guide. The algorithm then enriches the sketch from the input photograph details and colors, and allows a time-coherent walkthrough in the scene. In the second part of the talk, I will present a method for interpolating probability distributions in a principled way, using mass transport concepts. This interpolation is called a Displacement Interpolation, and consists in partially advecting a function toward the other, rather than blending them. The proposed method is Lagrangian

and based on the advection of mass particles, and can be performed in a multiscale way. We will see various Computer Graphics applications of this interpolation, such as BRDF interpolation, stipples advection for Non Photorealistic Rendering, or interpolating optimal paths for character animation.

16h00-17h00

Frederic DEVERNEY INRIA Grenoble
The geometry of stereoscopic 3D cinema: issues and research directions

Stereoscopic cinema has seen a surge of activity in recent years, and all of the major Hollywood studios have been releasing 3-D movies since 2009. This is happening alongside the adoption of 3-D technology for sports broadcasting, and the arrival of 3-D TVs for the home. Two previous attempts to introduce 3-D cinema in the 1950s and the 1980s failed because the contemporary technology was immature and resulted in viewer discomfort. But current technologies – such as accurately-adjustable 3-D camera rigs with onboard computers to automatically inform a camera operator of inappropriate stereoscopic shots, digital processing for post-shooting rectification of the 3-D imagery, digital projectors for accurate psitioning of the two stereo projections on the cinema screen, and polarized silver screens to reduce cross-talk between the viewers left- and right-eyes – mean that the viewer experience is at a much higher level of quality than in the past. Even so, creation of stereoscopic cinema is an open, active research area, and there are many challenges from acquisition to post-production to automatic adaptation for different-sized display.
In this talk, after a brief description of the current state-of-the-art in stereoscopic cinema, we focus on the problem of adapting stereoscopic movies to different screen sizes and distances while preserving the perceived scene depth. We also discuss open problems and future work on stereoscopic video processing, either in the production stage, or in post-production.

17h00-17h30

Lucian STANCULESCU LIRIS Lyon / LJK Grenoble
Freestyle, sculpting meshes with topology changes

We present a real-time method for sculpting triangular manifold meshes while enabling arbitrary surface deformation with seamless topological changes. Our insight is that the use of quasi-uniform mesh sampling, an interesting option now that very large meshes can be edited and displayed in real time, provides the right framework for expressing and effciently processing arbitrary changes of topological genus. The user controls deformation by gesture: he sweeps tools that apply a variety of deformation fields, from smoothing and trimming ones to local inflation and constant volume deformation tools. Meanwhile, the quasi-regular mesh seamlessly splits or locally blends when and where needed, while still following the user-specified deformation. Our method guarantees a closed, self-intersection-free mesh, whatever the user action. We demonstrate the practical usability of the resulting, interactive sculpting system through the sculpture of models that would have been extremely dicult to achieve with both current research methods and state of the art professional software.