**Objectifs globaux, verrous scientifiques/techniques  
(Max caractères: 4000)**

The DADA project will coordinate the work of four leading research teams in computer graphics, embodied conversational agents, statistical machine learning and theatre studies towards the common goal of advancing the state of the art in autonomous digital actors to the point where convincing dramatic performances can be directed and rendered on a laptop computer by theatre directors.

Creating believable, human-like performances by virtual actors is an important problem in many digital storytelling applications, e.g. creating non-player characters (NPC) for video games, creating expressive avatars in next-generation virtual worlds, populating movies and architectural simulations with background characters and crowds, creating believable virtual tutors and coaches in educational serious games, and creating believable characters for interactive fiction and interactive drama.

A desirable feature for such applications is the ability to create virtual actor performances which are both expressive and controllable. Motion capture actors are expressive, but once recorded, their performances cannot easily be controlled, edited or modified. As a result, game companies ought to get engaged in extensive motion capture sessions of all actions and moods of all characters in every new game they create. On the other end of the spectrum, procedural 3D animation can be controlled in every detail using sophisticated programming techniques, but they fall short of providing the level of expression required for conveying the subtle inflexions of human-like performances.

The goal of the project DADA is to develop autonomous actors that offer the adequate balance between autonomy and control. To reach such a goal, the project has to tackle several issues: (1) offer on one hand expressive animation and on the other hand high control over the animation; (2) expressive performance of the virtual actor; (3) intuitive authoring tool, to be used by theater director.

To answer the first issue, we will merge scripted and procedural approaches. it will allow us to create autonomous actors able to follow a script (specified in high-level command-like language) that gives the main directions the actors ought to follow while adapting their behaviors autonomously to the virtual environment they are placed in that includes objects and other actors.

To enhance expressive performance of the virtual actor we will rely on 3 main models: (1) A Proxemic model to compute the precise positions and orientations of actors at all time, given the director’s blockings. (2) A Kinesic model to compute body posture related to actions and communication (including arms movement, gaze behavior, torso direction, etc) given the director’s blockings and the precise positions and orientations of actors at all time. (3) A Multi-modal statistical models of individual body movements from annotated, mainly from mocap data, to generate novel expressive animation suitable for dramatic performances.

One major difficulty is to generate and merge values for all degrees of freedom of the virtual actors with high quality, avoiding the robotic effects associated with procedural animation, and the repetitive effects associated with data-driven methods.

More precisely, we will work to make each performance plausible (actor maintains personality of the role), expressive (actor follows director’s commands) and natural (actor adapts to the environment with variations)