**Résumé (non confidentiel) du projet en anglais  
(Max caractères: 4000)**

Character animation has been tackled through various approaches in the past. To name a few, chosen among those that are directly related to DADA, we can cite: embodied conversational agents (ECA); statistical models learned from motion capture examples; physically-based animation; and speech-driven animation. Very few attempts have tried to merge these various approaches into a single model offering on one hand expressive animation and on the other hand high control over the animation. In order to make progress in the field, we propose to shift the focus from autonomous characters to autonomous actors. Autonomous characters make decisions based on AI models of their personality and goals. In contrast, autonomous actors follow a precise script, written by the director, while adapting their behaviors autonomously to the virtual environment they are placed in that includes objects and other actors.

The goal of the DADA project is to design, implement and evaluate novel interfaces for directing expressive, autonomous virtual actors, borrowing from established theatre practices. We will combine fundamental research in 3D animation, machine learning and intelligent agent programming to leverage motion capture data sets of professional actors into a virtual theatre company of synthetic actors with acting skills, i.e. ability to respond to a director’s instructions and to perform together on a virtual stage. Virtual theatre will be used as a test application for obvious extensions to other digital storytelling applications.

To reach this ambitious goal, DADA will learn parameterized models of actor’s movements and gestures from existing annotated motion capture databases of actor performances; and create intuitive authoring tools for creating a script of actions and cues in a machine-readable format suitable to real-time control of the virtual actors. More precisely, the academic partners of the project will engage fundamental research along two main directions:

1. Animating autonomous actors procedurally. A key idea in DADA is to separate the animation model into a proxemic component regulating how actors interact with each other and the audience, and a kinesic component regulating how actors use their body language to communicate moods and expressions (Tannenbaum 2014). The proxemic component of animation will drive the positions and orientations of actors on the stage as well as their gaze directions. This component will be driven by a model encompassing the social relations between and the emotional attitudes of the autonomous actors. The kinesic component of animation will drive all other degrees of freedom of the virtual actors. This component will be driven by parametric statistical models trained from an existing motion capture data-set. The separation between the two components is expected to yield important benefits in terms of expressivity and composability.

2. Synchronizing virtual actors to a single story-line using a story-driven architecture of actors following a scripted sequence of instructions. In contrast to previous works, which used programming languages, we will investigate multimodal interfaces offering directorial control in a high-level, pseudo-natural language familiar to the director. The language will be compiled internally to a finite-state machine representation controlling the real-time execution of the autonomous actors.

All developments will be validated by experiments with the theatre department of Paris 8. Starting from a selection of play scripts in various genres and with increasing complexity, theatre experts will use the DADA tools to create virtual theatre performances in the Unity game engine, including stage movements and actions (entering, exiting, sitting down, standing up, taking and putting objects on the stage); body language expression of the personalities, moods and emotions of the characters; and believable gaze, proxemics and action/reaction behaviors between actors.