Visual Dance Performance for Interactive Characters (ViDaPe)

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Introduction

The increasing availability of large motion databases, in addition to advancements in motion synthesis, has made motion indexing and classification essential for easy motion composition. In this project, we propose a novel method for synthesising movements between real and virtual characters so as to compose a contemporary dance scenario based on their improvisation and interlinked actions. The system can be adjusted dynamically according to the performers' actions and responses, offering the maximum possible interaction.

Dance Motion Capture Database

We have designed a high quality dance motion capture database; we have captured more than 80 performances, including contemporary and folk dances.

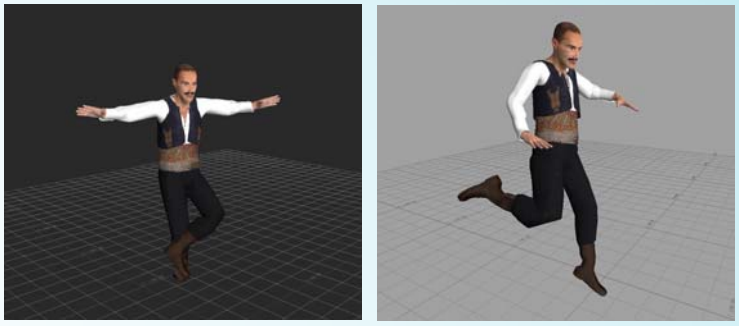

Figure 1: *Sample frames from motion captured folk dances contributed to the Dance Motion Capture Database.*

Laban Movement Analysis

Human movement is complex and it is difficult to describe. LMA is a language for interpreting, describing, visualizing and notating all ways of human movement. LMA offers a clear documentation of the human motion and it is divided into four main categories: Body, Effort, Shape and Space.

Motion Analysis

- We have proposed 24 features which can be used to describe the four LMA components and are indicative to capture the motion properties.
- The results demonstrate the effectiveness of our the proposed features to extract the qualitative and quantitative characteristics of the movement.

Motion Evaluation

We have developed a motion evaluation methodology that takes into consideration the body geometry and the stylistic variations of the performance. The proposed evaluation model allows further customization of the LMA assessment criteria in accordance with the anatomical characteristics and experience of the trainee.

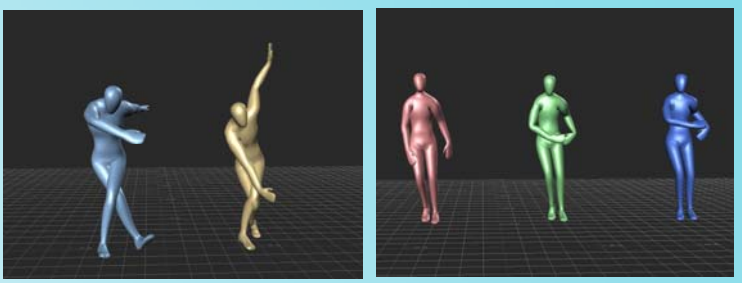

Figure 2: *Snapshots from our experimental data, where the student imitates the teacher's movements.*

Motion Retrieval and classification

A query-by-example search engine has been developed for motion retrieval based on the LMA theories. In addition. we have investigated the similarities between various emotional states of dance performers with regards to the arousal and valence of the Russell's circumplex model, while the performances have been classified with regards to the quantitative and qualitative characteristics of the movement.

Motion Synthesis and Interaction

A novel motion synthesis function has been implemented which, in addition to the bodily characteristics of the movement, it takes into consideration the quality of the motion. The achieved transition is visually more realistic than the current state-of-the-art methods. Finally, a platform has been developed where a real character interacts with a virtual character in order to compose a contemporary dance scenario based on their interlinked actions.

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