Motivation

- Character animation is essential for many branches such as gaming industry and automotive manufacturing
- There are various heterogeneous approaches which are specialized on certain aspects (e.g., path planning)
- Motion blending is widely used and provided by most common gaming engines and simulation platforms
- Specialized approaches such as recent AI-methods or physics-based simulations are tightly embedded within tailored platforms

- High porting efforts to incorporate novel approaches
- Currently no possibility to couple heterogeneous character animation systems within a common environment
- No comprehensive simulation using distinct approaches

Approach

With the novel concept, the exchange of heterogeneous character animation approaches will be simplified by using a standardized interface build upon the Functional Mock-up Interface (FMI) approach [1].

- FMI allows to couple heterogeneous simulations in a different context than motion (e.g., production plants)
- Extension of the FMI standard to exchange character animation approaches
- Encapsulation of heterogeneous character animation systems by so-called Motion Model Units (MMUs)
- Generation of natural and continuous motions by using a co-simulator which sequences the respective MMUs

Motion Model Unit

The core components of the proposed concept are the so-called Motion Model Units (MMUs). These units encapsulate the specific character animation systems via defined interfaces. The main principles for the execution are listed below:

- Initially, the context and motion description are set
- Afterwards, the “do step”-routine is cyclically executed by the co-simulator until the motion is finished
- The next character pose is computed within this routine by the internal algorithm of the MMU
- Subsequently, the computed result is provided as output of the respective MMU

Benefits

By utilizing a standardized exchange format for character animation approaches, there are various benefits for the developers, as well as for the end-users:

- Reduced porting efforts for incorporating novel approaches
- Combination of approaches to simulate complex behaviors in a common environment
- Reusability of already existing methods
- Benchmarking of diverse systems in a common framework
- New market for distributing the MMUs

Results

- Combination of a statistical motion synthesis [3], an animation based system [2] and a specialized tool for path planning in a common environment by using the novel MMU approach
- Overall, the system was able to produce natural motions, while combining the benefits of the distinct approaches

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