MOSIM

Unifying the field of human motion simulation

Despite advances in digital modelling, human motion simulation remains time-consuming. The ITEA project MOSIM will automatically generate complex simulations and promote cross-domain exchanges through its MMU library, modular framework and co-simulator.

ADDRESSING THE CHALLENGE
From manufacturing to entertainment, digital modelling activities have become commonplace across diverse domains. When it comes to the simulation of human motion, the ability to predict real-world behaviour is crucial; however, increasingly complex workflows can only be partly simulated without resorting to numerous heterogeneous solutions focussing on a few criteria (such as ergonomics or time assessment). This results in enormous manual effort for end-users. Additionally, small-scale providers cannot share their models and algorithms easily or securely. All sections of the value chain would benefit from a modular framework for the flexible integration of various modelling approaches and the cross-domain distribution of these.

PROPOSED SOLUTIONS
MOSIM (End-to-end Digital Integration based on Modular Simulation of Natural Human Motions) will advance this field through the co-simulation of human models from different environments. Firstly, specialised behaviour models (e.g. ‘pick up’) will be encapsulated into Motion Model Units (MMU). Inspired by the Functional Mock-up Interface (FMI) standard, these offer standardised interfaces hence enabling easy integration. MOSIM will oversee the implementation of an extensive MMU library, similar to an app store, in which companies can buy and sell models. As MMUs are black-box units – the underlying algorithms are not accessible to the purchaser – intellectual property will be protected. The next step is a modular framework to integrate various MMUs and execute them in the correct order, allowing for the straightforward simulation of high-level tasks. MOSIM is investigating artificial intelligence reasoning approaches in order to derive optimal context-based sequences of MMUs. Finally, a co-simulator will transform this plan into natural and continuous motions.

PROJECTED RESULTS AND IMPACT
As no universal framework for automatic motion modelling currently exists, MOSIM is set to impact many lucrative domains. One of the largest domains, the gaming market, was worth as much as USD 109 billion in 2017, and other domains are keen to explore the use of gaming technologies in non-gaming contexts. This especially applies to the manufacturing sector. By reducing the manual labour of modelling, MOSIM will push down costs while opening up new business models across such formally disparate fields; through its protection of intellectual property, it will also allow SMEs to participate in these markets. Due to its pioneering nature, MOSIM may even be able to set new standards in the world of modelling.
ITEA is a transnational and industry-driven R&D&I programme in the domain of software innovation. ITEA is a EUREKA Cluster programme, enabling a global and knowledgeable community of large industry, SMEs, start-ups, academia and customer organisations, to collaborate in funded projects that turn innovative ideas into new businesses, jobs, economic growth and benefits for society.

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**MOSIM**

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August 2021

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