Game research for training and entertainment

Symposium "Game Innovation"

The GATE project has now reached the half-way point. **To celebrate this occasion we organize on July 8 a free symposium under the title Game Innovation.** During this symposium we will highlight the many exciting results we achieved in the first half of the project. We will show innovative game technology for the automatic creation of virtual worlds, we will demonstrate how virtual characters can behave more believable, we will present new interface techniques based on gestures and brain-machine devices, and we will illustrate how learning processes in games can be improved. You can play with the results of our innovative game pilots in education and health. And we will inform you about the ways we transfer the knowledge developed in the GATE project to industry.

The symposium will be a combination of lectures, demonstrations, and posters. Brief lectures will provide a high-level view on the work done while through the demonstrations and posters you can get more detailed information. And of course we will schedule ample time for discussions and networking. Currently the program looks as follows:

10.00 Registration and coffee
10.30 Innovation for Games by Mark Overmars, director GATE
11.00 Lectures on research results in the GATE project
12.30 Lunch
13.30 Lectures about the innovative use of games in education, healthcare and safety
14.30 Market with demonstrations and posters
16.00 Lectures on knowledge transfer projects with industry
17.00 Drinks
18.00 End of the symposium

The symposium is held at Utrecht University in the Megaron lecture hall in the Educatorium. Entrance is free but it is mandatory to register for the meeting. You can register through the webpage http://gate.gameresearch.nl/symposium. Here you can also find more detailed information. We look forward to welcoming many of you at the symposium Game Innovation.

Mark Overmars
Utrecht University
Director GATE

Motek Medical

A new GATE knowledge transfer project has been started between Utrecht University and Motek Medical. For many computer animation applications, such as games or movies, the most important criterion is that motions 'look good'. However, for other applications, such as medical and sports tools used for rehabilitation and training, animations need to be also biomechanically correct. The goal of the project is to build a system that is able to generate such biomechanically correct animations of humans by controlling muscle activity using a musculoskeletal model. The project will run for two years. More information can be obtained from the project leader Arjan Egges (egges@cs.uu.nl).

The GATE project supports many other knowledge transfer projects in which researchers from the GATE partners collaborate with companies to make research results fit-for-use for industry. If you are interested in participating in such a project, please contact the project manager Piet Buitendijk (pietb@cs.uu.nl).

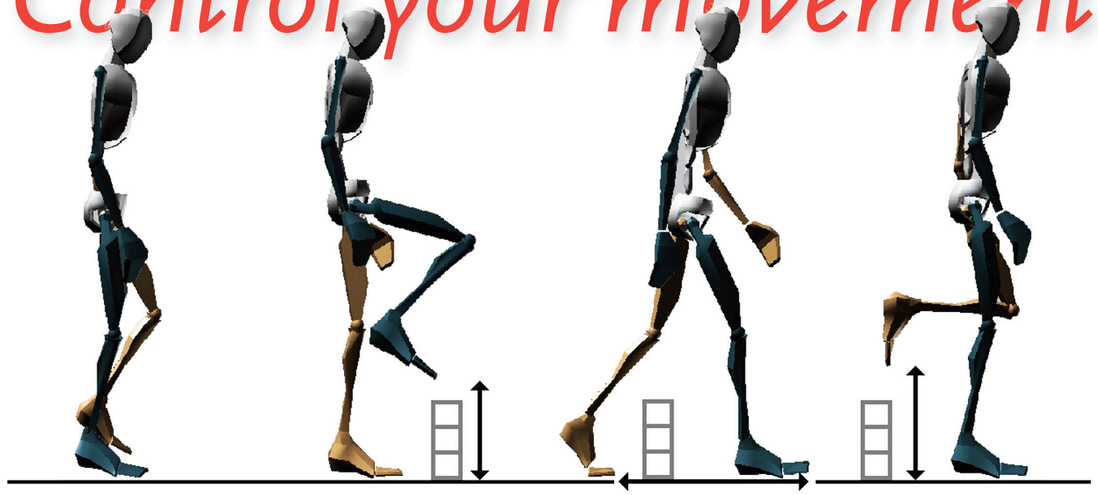
Motion in Games

From 14-16 November 2010, the GATE project organizes for the third time the international conference on Motion in Games (MIG 2010). The conference will bring together top researchers from all over the world to discuss recent developments in animation systems, path planning, physical simulation, crowd simulation, motion capture techniques, motion analysis, and related topics. Papers for presentation at the conference can be submitted to the program committee until July 8. For more information see www.motioningames.org.

GATE.GAMERESEARCH.NL

Control.

Control your movement



RESEARCH IN PROGRESS PART 3

Creating realistic character movement by studying human behaviour.

Imagine walking down a flight of stairs while reading a document and drinking a cup of coffee. You could easily do this without tripping or spilling any of the coffee. While this task poses no problem for most people, it is very challenging to have virtual characters behave similarly. Sander Jansen, a PhD-student for the GATE project, searches for the solution to this problem in understanding human behaviour.

Virtual characters have continued to improve their appearance ever since they were first introduced. Both their physical looks and their 'intelligence' seem to be very advanced. Their movements however still fall short. Think for instance of complex movements such as avoiding obstacles, walking down stairs or moving on a slippery surface. It is very difficult to generate these movements for games. Realistic character movement is important as it increases user involvement in games. This is especially true for serious games in which the user is trained in a virtual environment to perform tasks in the real world. As is the case in simulations of military missions and training of fire fighters. Both of these usually involve multiple characters. The effect of training increases when these characters move naturally through the environment.
One way to generate realistic character movement is by using full body motion capture. This technique allows for direct mapping of an actors movement onto a virtual character. Although this does generate believable behaviour, it is very time consuming and costly, since every specific movement needs to be recorded. For example, in order to have characters walking at different speeds, you need to record actors walking at each of these speeds. Another problem arises when additional recordings need to be made. The same actor has to be hired in order to get consistent animations.

Using motion capture as a measurement tool

Jansen and colleagues aim for a different approach, creating mathematical models of human movement. They do so by performing experiments with human participants, which allows them to investigate the effects of certain manipulations on human movement. The knowledge gained through these studies is combined in models that can reproduce and predict realistic behaviour by setting only a few parameters. Motion capture can be used as a measurement tool in this regard.
For example, when recording people stepping over obstacles on the floor, it is possible to measure things such as speed of movement, toe clearance and stride length. With this information you can say something about the total amount of energy needed for such an action. When doing this with obstacles of different height and width, it is possible to reveal relationships between several of these movement factors. Once it is known why we move as we do, it is possible to predict how we move when the situation changes, such as stepping over obstacles of diverse dimensions. This approach can also be used for many other tasks, like walking on uneven terrain, or avoiding moving obstacles. As interesting as this knowledge is in its own right, it can also be applied to steer virtual characters in ways that are much more natural than we see in present-day games and simulations. By better understanding the behaviour we try to simulate, we can create characters that can adapt their movement to complex situations in a realistic manner.

Sander Jansen works as a PhD for both Utrecht University and TNO Human Factors. He has a master's degree in Cognitive Psychology and is especially interested in human optimization strategies during obstacle avoidance. His research is embedded in the GATE project "Modeling Motor Behaviour". Sander can be reached at sander.jansen@tno.nl.