



Game research  
for training and  
entertainment

The GATE research theme Virtual Characters deals with the creation of realistic behavior for the virtual characters that inhabit the virtual worlds and games. These can be either avatar representations of the users or computer-controlled characters. Such realistic behavior is important to increase the immersion of players in the game world.

For example, we investigated the effects of both vertical and horizontal Field of View restriction on maneuvering performance and head movement while traversing an obstacle course consisting of three different types of obstacles. A restriction of both the horizontal and vertical angle of the visual field resulted in increased time needed to traverse the course. In addition, the extent of head movement during traversal was affected by vertical, but not horizontal viewing restriction. We also found that performance could not be improved by altering the orientation of the visual field instead of its dimensions.

In addition to modeling motor behavior, we also want to model the cognitive behavior of virtual characters. One of the main criteria of training simulations or serious games in general is the fact that all elements in the scenario need to be as realistic as possible. This entails that the virtual agents in the system need to be believable and perform behavior appropriate to the situation in the game. In order to create believable agents, that perform the role of virtual humans in the system, we investigate the workings of cognitive processes in humans and how those can be simulated by agents. More specifically we look at: How can cognitive states be formally represented and how do they

relate to the generation, selection and execution of behavior of the agent. In this work-package agent behavior is taken to include (but is not limited to) verbal and non-verbal communication and social behaviors in general.

Apart from modeling behavior, we also want to synthesize the motion of virtual characters. One of the basic operations that virtual characters must perform is navigating from their current location in the virtual world to a desired new location. Often multiple characters move in large groups or crowds in the same environment. Path planning and crowd simulation play an important role in computer games in the immersion that a player experiences. Although path finding has been extensively studied over the past years, traditional techniques have mainly focused on creating collision-free and short paths, rather than on creating natural paths. Existing real-time crowd simulation approaches also fail to deliver motions that are realistic or at least convincing to the viewer. We invent new, practical path planning and crowd simulation algorithms that generate convincing paths in real time.

In all these cases, further innovation is needed. More insight into how to model behavior, and new methods to synthesize actions of virtual characters are necessary to push the frontiers of the state of the art in modeling virtual characters. The GATE project goes on.

Remco Veltkamp *Utrecht University*



### Creative Game Challenge

The Creative Game Challenge is a game-making contest for high school students. Its purpose is to improve the interest in different aspects of computer science and in a computer science education. The contest is organized by Roland Geraerts, an assistant professor who teaches Game technology at Utrecht University. During this contest, the students are provided a free license for YoYo Games' Game Maker engine and are asked to build a water-themed game. Through newsletters, interactive discussions, websites, forums, and social networks, the students are motivated to participate and to continually improve their game.

This year, a total of 264 teams registered for the event, and these teams produced 113 games. The members of the Dutch Game Development and Research Club (DGDARC) are currently preparing a nomination of the 20 best games. These games will be transferred to an independent jury composed of Michaël Bas, Arjan Brussee, Zuraida Buter, Juney Dijkstra, Jan-Pieter van Seventer, and Marlies Wijnen. They will assign nine prizes (7,500 euro) to these games based on criteria such as playability, design, and connection to the theme. The final event will take place at De Uithof in Utrecht on June 24. Besides awarding the prizes, which is carried out by our special guest Erik Hulzebosch, there will be several gaming activities, including dancing on many dance pads, Kinect gaming, 3D gaming, and student demos. All members and coaches of the nominated teams will receive a nice present from Microsoft. While the submission of games has been closed, the contest will be organized again next year thanks to the financial support of the CAICT organization.

