Swedish research can make Super Mario more realistic

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Computer games are being developed at an ever more rapid pace, and the technical demands are rising, not least regarding graphics boards. At Mälardalen University in Sweden, researchers have now found a solution to a problem that often arises when new computer games are constructed, namely how you can efficiently make sure that the animated figures don't run right through each other.

Researcher Thomas Larsson is presenting a new model that enables complex figures to collide with each other in a credible way - preferably with sound effects, deformations, and other consequences, just as in reality.

In his dissertation he presents faster methods for discovering collisions in interactive simulations with computer graphics. The methods function both with rigid bodies and various types of deformable bodies. Besides computer games, simulations in robotics, virtual surgery, and visualization are suitable applications for the methods.

"Today regular computers can draw realistic images of complex 3D environments in the blink of an eye. This is thoroughly exploited in modern computer games, for example. The images are therefore better and better in quality, so people even use terms like photographic realism. These images are generated by a powerful graphics board in the computer, which draws millions of tiny surfaces, usually triangles, in a few milliseconds."

“But it’s not enough simply to draw the images. To animate or simulate objects that move or fly around on the screen, the objects need to be able to react to collisions. In many cases the collision calculations, just like the image generation itself, have to be done in a few milliseconds, otherwise the interactivity and the experience are ruined.”

All this is self-evident in the real world where objects follow the rules of physics governing movement and collisions. But in a computer simulation objects go right through each other as if they had never collided, unless special measures are taken. These measures require methods that use calculations to discover that objects are actually colliding with each other and then take suitable measures. In some cases it is sufficient to have the objects change direction by bouncing off each other. In other cases they may need to be dented (deformed), break into pieces, or even explode.

Future versions of “Super Mario” will require superfast collision calculations in order to stimulate and visualize characters’ movements and interaction with their surroundings in a realistic manner.

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