

Crowd Simulation Zombie Crisis

Abstract:

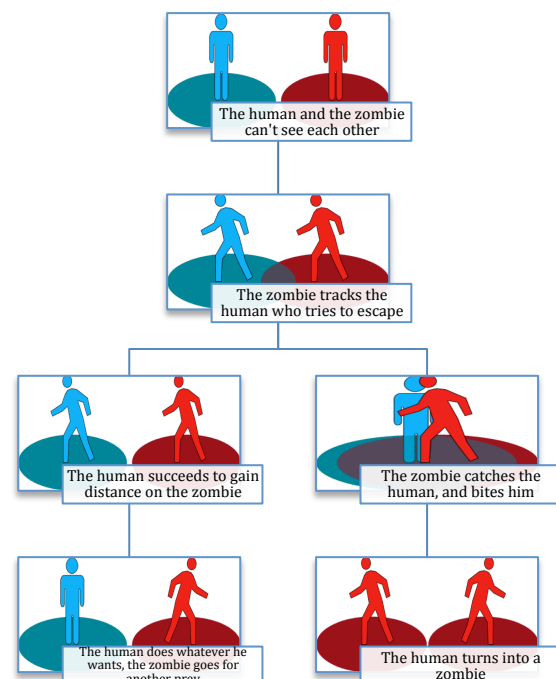
The "Crowd Simulation – Zombie Crisis" tool is the result of an annual project created by a team of 3 students, working with the software "Blender" and using its game engine technology.

The main purpose of this project was to simulate a crowd in a city, and after a while to add some zombies here and there to create a crisis situation.

At the beginning, the humans are simply walking around with their own individual destinations. Then when the user decides that it's time to have fun, he has to press a key to generate the zombies. As soon as the zombies are in the city, they will start to chase the humans, and contaminate them. At the same time, when one or a few zombies are around a human, he will start to run and avoid them. When a human feels safe he will then go back to his normal state, and start to walk around again. If a zombie catches a human, the human will then turn into a zombie, and chase the other humans.

Exposition:

The blender software contains many useful tools, and more especially for the Blender Game Engine (BGE). As we were using this technology, we obviously made use of these tools, and the most important and useful ones are the navigation mesh and the steering logic object. The first one (navigation mesh) is used to create an area from the city where the characters (humans and zombies) will be able to move. Thanks to this, characters won't go through the walls or off the edge of the map. The second tool, the steering logic object, is actually an object that will be put on the characters, with the behavior mode set to "Path following". With this setting characters will be able to find their way from a point A to a point B according to the navigation mesh previously set.



These 2 tools are basically the bases of our program. We use many other logic objects that are set on the characters but the steering is the one that is used the most and which allows us to make our crowd "alive". Many scripts control the

behavior of the characters and tell them what to do. Thus the crowd interacts with itself and reacts when zombies are in the proximity. The crowd can also return if the zombies move away.

Conclusion:

In the end, we have a tool that allows the user to set and generate a crowd pretty easily in a few clicks. Thanks to a lot of optimizations we are able to generate about 100 characters interacting at the same time on an average computer. The BGE offers a lot of possibilities and we tried to use as many as we could, it's definitely not the easiest way to program a tool, but the result is worth it.

We still have a lot of ideas that could be added in order to improve our tool. One of our improvements would be to be able to record all the movements made by the characters and save them into an animation file, this way we could use it in another 3D software such as "Unity" or "UDK" to manipulate a crowd.

We think that this tool can provide help for any 3D animators working in the video game industry or for cinema. As the zombies are optional, the user does not only have a crowd simulation with zombie attacks, but also a basic crowd simulation with people hanging around.

Resources:

http://www.tutorialsforblender3d.com/BGE_Python/BGE_Logic_Bricks.html

<http://blenderartists.org/forum/showthread.php?229146-Character-animation-in-blender-game-engine>

<http://blenderartists.org/forum/showthread.php?200444-Fresnel-effect-tutorials-render-blend-file>

<http://www.blenderfreak.com/blog/post/how-create-objects-and-handle-movement-bge/>

<http://solarlune-gameup.blogspot.fr/search/label/BGE%20Tutorials>