

2.5 D OR VOXEL GRAPHICS

There are several types of graphics: raster, vector graphics and 3D technologies of digital visualization and the fourth, least popular way of displaying graphics – voxel or 2.5 D. Voxel graphics is a regular raster in three-dimensional space, only the Z axis, which is the depth, is added to the color parameters and coordinates of the X and Y axes that are standard for the raster. As well as the pixel in 2D graphics was the minimum unit from which the image was built, the voxel is the smallest unit of the volumetric image.

A well-known game Minecraft is an ideal example for understanding voxel graphics. Although Minecraft really serves as an excellent illustration of the principles of voxels, this is actually the most common 3D with three-dimensional models and textures, which only parodies the voxel graphics.

If we talk about computer games, then the main advantage of voxel technology is its compliance with point changes. Since the voxel itself is the brick from which a certain volumetric object is built, it will be much easier to remove this brick from the total mass than to try to deform a solid 3D object. In short, destructibility in voxel games is easy and pleasant to do.

Voxel graphics is also used in medicine (tomography, MRI and ultrasound imaging is visualized in voxels). Thanks to voxels, it has become possible to sort through the body tissues in layers.

The voxel space representation is a prerequisite for creating a huge network of interactive virtual environments which at some point will begin to resemble the real world. The key point is that such environments are not static and allow users to interact with them in the usual way in the real world. Such virtual environments must be fully modeled and have persuasive physics. The simulation and rendering of a complex, fully dynamic world requires such a world be voluminous, and all processing, synchronization and rendering of the geometry being modeled must be effective. The volumetric nature of this process excludes the use of polygons. Other vector representation forms are not effective enough to create high quality at low cost.

If you want to try making such graphics, there is an excellent editor – MagicaVoxel. It is a free lightweight 8-bit voxel editor and interactive path tracing renderer available for PC and MAC. This software is the core of voxel art, since it is capable of many things: just edit, paint and move your voxels in a cubic grid, then animate and render them with the powerful integrated renderer. Main

advantages of MagicaVoxel are full openness, small size, good editing tools, a functional rendering engine and low resource requirements.