

VOXEL

What's in the box?

In 3D computer graphics, a voxel represents a value on a regular grid in three-dimensional space. As with pixels in a 2D bitmap, voxels themselves do not typically have their position (i.e. coordinates) explicitly encoded with their values. Instead, rendering systems infer the position of a voxel based upon its position relative to other voxels (i.e., its position in the data structure that makes up a single volumetric image).

In contrast to pixels and voxels, polygons are often explicitly represented by the coordinates of their vertices (as points).
A direct

consequence of this difference is that polygons can efficiently represent simple 3D structures with much empty or homogeneously filled space, while voxels excel at representing regularly sampled spaces that are non-homogeneously filled.

Voxels are frequently used in the visualization and analysis of medical and scientific data (e.g. geographic information systems (GIS)). Some volumetric displays use voxels to describe their resolution. For example, a cubic volumetric display might be able to show $512 \times 512 \times 512$ (or about 134 million) voxels.

