

Abstract

In the world of three-dimensional visualization, be it through manual drawing or computer generated graphics, the prevailing and typically used perspective system is the linear perspective. This deeply rooted system although being extremely effective in the representation of three-dimensional space, presents various limitations due to the tendency to distort the image when large fields of view are involved, compromising the comprehensibility of the represented objects. Other existing perspective systems, like the curvilinear systems - spherical or cylindrical - do not present the same problems as classical, and have interesting characteristics regarding large fields-of-view and peripheral vision. The Extended Perspective System - EPS - intends to present an alternative in the visualization of three-dimensional scenes by including the most interesting and helpful features of each of the previously mentioned perspective systems and blending them dynamically into something that can enrich the graphical representation of a scene.

In this project we created an implementation of the EPS, developing a prototype of an application which allows to visualize 3D scenes using this system, while being able to change dynamically the main parameters that define the perspective - oscillating between linear and curvilinear systems - creating a 'window' to this new world of possibilities.

Problems such as interaction and navigation in three-dimensional space (related with the projection system) and hidden surface removal are also addressed and their solutions presented.

Keywords: Extended perspective system, Architectural drawings, Non-linear projections, Computer graphics, Hidden surface removal.