Interpretive OpenGL for computer graphics
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Abstract

OpenGL is the industry-leading, cross-platform graphics application programming interface (API), and the only major API with support for virtually all operating systems. Many languages, such as Fortran, Java, Tcl/Tk, and Python, have OpenGL bindings to take advantage of OpenGL visualization power. In this article, we present Ch OpenGL Toolkit, a truly platform-independent Ch binding to OpenGL for computer graphics. Ch is an embeddable C/C++ interpreter for cross platform scripting, shell programming, numerical computing, and embedded scripting. Ch extends C with salient numerical and plotting features. Like some mathematical software packages, such as MATLAB, Ch has built-in support for two and three-dimensional graphical plotting, computational arrays for vector and matrix computation, and linear system analysis with advanced numerical analysis functions based on LAPACK. Ch OpenGL Toolkit allows OpenGL application developers to write applications in a cross-platform environment, and all of the OpenGL application source code can readily run on different platforms without compilation and linking processes. In addition, the syntax of Ch OpenGL Toolkit is identical to C interface to OpenGL. Ch OpenGL Toolkit saves OpenGL programmers’ energies for solving problems without struggling with mastering new language syntax. Ch OpenGL Toolkit is embeddable. Embedded Ch OpenGL graphics engine enables graphical application developers or users to dynamically generate and manipulate graphics at run-time. The truly platform independent, scriptable, and embeddable features of Ch OpenGL Toolkit make it a good candidate for rapid prototyping, mobile graphics applications, Webbased applications, and classroom interactive presentation. The design issues of Ch OpenGL Toolkit and its potential applications are presented in the article. A methodology that can be used to implement a Web-based visualization system based on Ch OpenGL and Ch CGI is also introduced. The method described in the article can be easily followed to create a Web-based visualization system at low cost and with minimal effort. The software packages Ch and Ch CGI Toolkit are freely available and can be downloaded from the Internet.