A Visual Programming Environment Based on VTK for Scientific Visualization

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ABSTRACT

The Visualization Toolkit (VTK) is a C++ class library for 3D computer graphics, image processing and visualization. In addition to C++, the user can also access VTK through interpreted interface layers. To make use of VTK's ability, the user must have enough knowledge of object-oriented programming or interpreted languages that VTK supports. For clinical users or generic researchers, the learning threshold of VTK is quite high. In this thesis, a VTK-based visual programming environment is proposed to solve the above VTK problem of high learning threshold. Our system allows the user to intuitively drag and drop VTK objects, and create a pipeline by connecting these objects with a graphical user interface. Also, for each VTK object, its attributes or parameters can be set by the use of a dialog box. Each pipeline can be executed to have the results displayed on the screen, or to generate its corresponding C++ code. With the help of our system, users without professional programming skills can easily create a domain specific application or a prototyping system. Three examples, including sphere creating, image processing and surface rendering, are given to demonstrate the feasibility of our system.

Keywords : Visual Programming ; VTK ; Computer Graphics ; Image Processing

Table of Contents

第一章 前言
第二章 相關技術
第三章 系統分析與設計
第四章 結果
第五章 結論

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