適用於醫療視覺系統之應用程式框架

黃健彰、張顧耀

E-mail: 9606932@mail.dyu.edu.tw

摘 要

利用框架（framework）開發應用程式可減少常用功能重複開發，提高應用程式開發效率。但框架本身龐大的架構常讓使用者無法輕易地了解與使用，造成入門學習門檻甚高。而實際應用程式之開發往往需要同時使用多種框架，除了增加學習的成本之外，也會產生框架整合方面的問題。本論文以醫療視覺之應用為例，說明在整合不同框架時所遇到之問題，包括架構不協調、框架重疊、框架控制與功能整合等，並提出解決的方式。同時，我們更進一步地設計並實作一適用於醫療視覺系統開發之框架，稱之為MVC（Medical Visualization Class）。該框架整合了視窗程式設計的MFC（Microsoft Foundation Class）、影像處理的ITK（Insight Toolkit）與科學視覺化的VTK（Visualization Toolkit）等框架，提供醫療影像檔案讀取、影像處理與二維/三維呈像等功能。透過MVC來開發醫療視覺系統，不但能夠充分利用不同框架所提供的各種功能，也可以大幅降低程式開發者對於框架之學習時間，進而加快系統之開發。

關鍵詞 : 應用程式框架，框架整合，醫療視覺

目錄

參考文獻

[1] Mohamed E. Fayad, Douglas C. Schmidt, Ralph E. Johnson, Building Application Frameworks: Object-Oriented Foundations of Framework Design. New York, John Wiley & Sons, 1999.

[2] Dirk Baumer, Guido Gryzan, Rolf Knoll, Carola Lilienthal, Dirk Riehle, and Heinz Zullighoven, "Framework development for large systems," Communications of the ACM, Vol. 40, No. 10, pp.52-59, 1997.

[3] Jan Bosch, Peter Molin, Michael Mattsson, PerOlof Bengtsson, "Object-Oriented Framework-based Software Development : Problems and Experiences," ACM Computing Surveys, Vol. 32, No.3, pp. 3-8, 2000.

[4] Polina Golland, Ron Kilinis, Chiristopher Umans, Michael Halle, Martha Elizabeth Shenton, Jens A. Richolt, "AnatomyBrowser: A Framework for Integration of Medical Information," Medical Image Computing and Computer – Assisted Intervention, Cambridge, MA, U.S.A., pp.720-731, October 11-13, 1998.

[5] Ralph E. Johnson, "Frameworks = (Components + Patterns), ” Communications of the ACM, Vol. 40, No. 10, pp. 39-42, 1997.

[6] Mohamed E. Fayad, Ralph E. Johnson, Domain-Specific Application Frameworks. New York, John Wiley & Sons, 2000.

[7] Isabel Harb Manssour, Sergio Shiguemi Furuie, Luciana Porcher Nedel, Carla M. Dal Sasso Freitas, "A Framework to Visualize and Interact with Multimodal Medical Images," International Workshop on Volume Graphics, New York, USA, June 21-22, 2001.

[8] Thomas Jansen, Bartosz von Rymon-Lipinski, Zdzislaw Krol, Lutz Ritter and Erwin Keeve, "JULIUS - An Extendable Application Framework for Medical Visualization and Surgical Planning," Computer Assisted Radiology and Surgery, Berlin, Germany, pp.184-189, June 27-30, 2001.

[9] Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, Design Patterns Element of Reusable Object-Oriented Software, 25nd ed., Baarn, Holland, Addison-Wesley, 2002.

[10] NEMA, Digital Imaging and Communications in Medicine, U.S.A., National Electrical Manufacturers Association, 2004.

[11] MIR DICOM Central Test Node Software, http://www.erl.wustl.edu/DICOM/ctn.html, 2002.

[12] Mohamed E. Fayad, Douglas C. Schmidt, "Object-oriented application frameworks," Communications of the ACM, Vol. 40, No. 10, pp.

32-38, 1997.
[13] Jeff Prosise, Programming Windows with MFC, 2nd ed., Washington, U.S.A., Microsoft Press, 1999.
[14] Qt-Trolech, http://www.trolltech.com/products/qt, 2007.
[15] Frank Bushmann, Regine Meunier, Hans Rohnert, Peter Sommerlad, Michael Stal, Pattern-Oriented Software Architecture – A System of Patterns, England, John Wiley & Sons, 2001.
[16] Will Schroeder, Ken Martin, Bill Lorensen, The Visualization Toolkit, U.S.A., Kitware Inc., 2004.
[17] William J. Schroeder, Lisa S. Avila, William Hoffman, "Visualizing with VTK : a tutorial," IEEE Computer Graphics and Applications, Vol. 20, No. 5, pp. 20-27, 2000.
[18] Ibanez, Luis, et al., The ITK Software Guide, U.S.A., Kitware Inc., 2005.
[19] Kitware Inc., The VTK User ' s Guide, U.S.A., Kitware Inc., 2004.
[20] Michael Mattsson, Jan Bosch, " Framework Composition: Problems, Causes and Solutions," TOOLS 1997: 23rd International Conference on Technology of Object-Oriented Languages and Systems, Santa Barbara, CA, July 28 - August, pp. 203-214, 1997.
[21] Ian Sommerville, Software Engineering, 8nd ed., England, Addison- Wesley, 2007.