



Proceedings

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Portable Viewers For Whole Slide Images

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Introduction/ Background

Whole slide images are the basis of actual Digital Pathology. We have not yet solved the problem of lack of standardization in image formats. Many different kinds of image formats coexist. Most of the time we use free viewers for local reviewing and complex servers for remote access. There is a tendency to integrate whole slide images inside hospital information environment with the rest of medical records. However this organization led to a loss of the physical management of the pathology images. We moved from the glass slides into a link in a server, and digital microscopy is really virtual microscopy.

Aims

With the aim of recovering the physical file archive for whole slide images to facilitate universal sharing of digital pathology images we evaluated the possibility of employing portable viewers from whole slide images. Technical difficulties have reduced the use of this type of viewers but they have the enormous advantage of the easiness of use and universal access without any installation, and display from any platform even from DVD. Open portable viewer are available and panoramic image photography generates a software technology that can be applied to Digital Pathology.

Methods

Four different source of whole slide images were used from four scanners: a Roche iScan Coreo, a 3D-hitech Mirax Midi, a Leica SCN400 and a Dako ACIS III, getting .jp2, .mrxs, .scn and .tiff files. Aperio Image Scope viewer was used to read and convert files into three kinds of testing format tiff, jp2 and flat jpg files. A commercial Zeiss Java based software was used as portable viewer for tiff files. No direct jp2 portable viewer could be found available so flat jpg files were used instead to evaluate three other portable viewers: Zoomify, Deep Zoom and HD View. Zoomify has its own file converter from a single jpg into a image folder containing hundreds or thousands of small fragmented jpf files to reproduce the pyramidal file organization of whole slide images. Microsoft Deep Zoom Composer was used to generate the specific type of jpg fragmented pyramidal files and both hdmake command line software and Microsoft Image Composite Editor (ICE) was employ for HD View (HDV) files.

Results

All four tested solutions can be used as portable viewers and keep good image quality and easiness of use and distribution, independent of servers and software installation. However previous work of conversion is necessary. The use of flat jpg files as source with its known file size limit of 65.000 pixels was overcome with ICE that works as stitcher software from different files. HDV works with zip files facilitating the use of a folder with a high number of small files. These solutions have for the future another standardization issue. They are using as visualizations technology Java, Flash and Silverlight. It seems that HTML5 will be soon substitutive standard, and probably has better security built but among its limitations is a bad solution as a local and portable active content viewer like whole slide images need.