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Development of DICOM Plug-in

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INTRODUCTION

DICOM(Digital Imaging and Communication in Medicine) is a protocol for transferring and archiving medical images. A CR-NEMA has published DICOM 3.0 part 1 to part 14. This standard is becoming more dominant in the medical imaging area with the spread of PACS(Picture Archiving and Communication System). DICOM 3.0 specifies its own file storage f ormat. DICOM file format can contain much more information than the general image file format can do, but its complic ate data structure makes it difficult to develop the tool to display the image of DICOM file. With the fast development a nd spread of internet, it has become possible to view the medical images remotely. One of the easiest way to implement medical image retrieval system through the internet is to store the images as a DICOM file format in the Web server and to view that image files using Web browsers. But general Web browsers cannot display DICOM file, so it is necessary t o develop the plug-in which makes the Web browser to handle DICOM files.

The purpose of this study was to develop a plug-in which makes it possible to display DICOM images directly on a Nets cape web browser, and to test the plug-in through the test DICOM web server.

METHODS:

1. Programming environment

We have developed a DICOM plug-in for Netscape navigator for the Windows 95/98 systems. We developed i t using MS Visual C++ 6.0. It was composed on the skeleton code of Netscape Plug-in SDK which is provid ed by Netscape Communications Corporation. We also took advantage of Microsoft Foundation Classes for the implementation of graphic functions.

2. Supported Transfer Syntax

Transfer syntax is a set of encoding rules in DICOM file. Our plug-in supports Explicit VR Little endian Tra nsfer syntax for uncompressed images and Baseline JPEG Transfer syntax for compressed images. The latter is useful in the case of slow network speed.

3. Functions

The most important function of DICOM plug-in is to display images using the Web browser's window. It has a few basic graphic functions such as zooming, panning and window level adjustment. It displays header inf ormation of DICOM file when the user requests.

RESULTS

DICOM images in the Web server were successfully displayed on the Netscape Navigator's window through i nternet(Fig. 1). JPEG compressed DICOM files resulted in fast transfer with insignificant image distortion. The plug-in could handle broad types of DICOM image files. All functions of the plug-in operated successfully.

CONCLUSIONS

Web-based DICOM image retrieval system is to be widely used with the fast development of internet technol ogy. We have developed a DICOM plug-in which has shown a good performance.

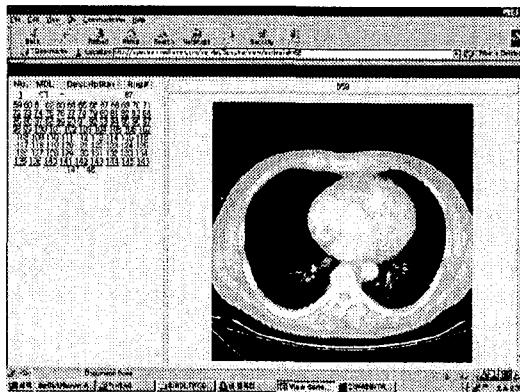DICOM plug-in can be used as a part of medical image database system and may be helpful for the tele-radi ology in the future.

Fig. 1. The result of viewing DICOM image by Web browser.