ProstateAnalyzer: GUI in Medical Domain with Management of DICOM Images of Prostate Cancer

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Purpose of the software: Medical support analysis systems are becoming increasingly important in assisting experts to supply more accurate and well informed diagnoses. Although there is increased interest in the management, storage and retrieval of digital images for diagnoses, most hospitals need specific and tailored software solutions to solve the management of data and its access in the network. In this paper, we propose a framework that comprises visualization and analysis for MR imaging of the prostate and a new storage system of clinical diagnoses in a single package. ProstateAnalyzer is such a network-based database system allowing the management of both MRI and spectroscopy data sets, and the possibility of performing basic mathematical operation images.

Methods/Implementation: ProstateAnalyzer has been designed as a web-based application within a Zend Apache server, also used as a MySQL database server for data storage. The application links a database of DICOM images with a XML server which stores a set of clinical cases (annotation files). Figure 1 shows the proposed architecture and the hardware needed to run the ProstateAnalyzer. This tool is implemented as a Java-based applet application to facilitate the inclusion of medical findings on existing prostate studies. These studies are created by means of XML files to annotate tumors and other pathologies provided by experts.
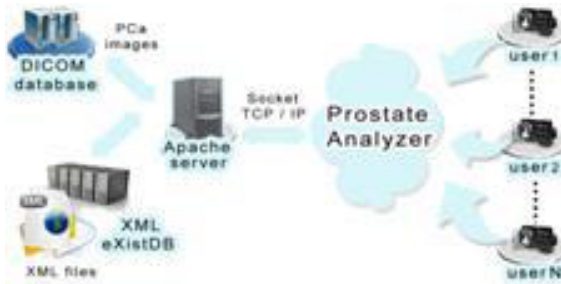
Figure 1: Network-based database system designed to implement the framework

Features illustrated at the exhibit: The main features of the software are based on four techniques of visualization: 3D T2-weighted imaging, Diffusion-Weighted Imaging with ADC maps, Perfusion-Weighted Imaging and 3D-MR Spectroscopy. These visualization capabilities are combined with basic post-processing tasks such as user-specific ROI, surface and volumetric measurements, ADC values, perfusion signal-time curves and individual spectrum visualization. A medical tool has been developed in order to globalize all these features in the same software and facilitate data management.

Figure 2: Multiple and user-specific ROI on 3D T2-weighted images.

Figure 3: Example of basic operations on ADC images.
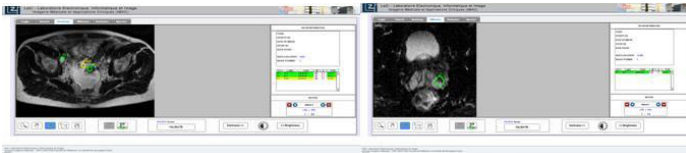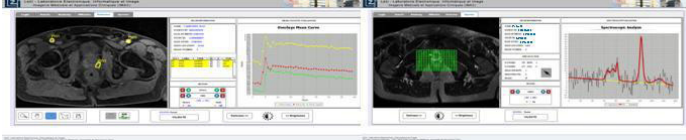

Figure 4: ROI analyses on perfusion images with corresponding signal-time curves.

Figure 5: 3D-spectroscopic imaging study

One of the most evident advantages provided by the tool is an improved create/recover/update prostate diagnosis provided by different experts. It is an efficient way to share and save information concerning the state of diagnoses. The tool offers the possibility to work remotely via the web and represents an improvement in data management. Taking into account how rapidly clinical databases are growing, ProstateAnalyzer will be an important contribution to the management of our database of more than 1000 patient data sets.