

Design and Evaluation of a DICOM compliant Video fluoroscopy Imaging System

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Abstract

Fluoroscopy is a special type of X-ray that provides continuous X-ray images (or live video) of a patient's organ structures in real time. It is used in many types of examinations and procedures, such as percutaneous nephrostomy (PCN), barium swallow, cardiac catheterization, and so on. The live fluoroscopy video is valuable for diagnosis review, teaching and research. They need to be stored as a part of the patient's medical records. Traditionally, the live fluoroscopic video can be saved by using video tapes. Since the nature of sequential access to a video tape, we cannot directly play or view a specific image. This makes the management of video tapes inefficient. Currently the DICOM 3.0 (digital imaging and communications in medicine) standard supports the MPEG-2 live video compression format. Most hospitals in Taiwan have developed their picture archiving and communication systems (PACSs) based on the DICOM standard to store and manage static X-ray images. Thus, it is the time for live fluoroscopic video to be captured, digitalized and integrated into the PACS for better storage, sharing and management. Although the DICOM supports the MPEG-2 compression scheme, it indicates that whether the clinicians can accept the lossy compression of MPEG-2 images is beyond the scope of the DICOM Standard. The paper presented here proposes approaches to develop a DICOM MPEG2 compliant fluoroscopic video management system integrated seamlessly with other hospital systems, and presents methods to evaluate the system acceptance from the viewpoint of clinicians. We conclude that the quality of the fluoroscopic video represented by the DICOM MPEG-2 specification is as good as or better than that represented by traditional video tapes.