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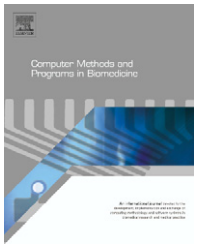

CASANDRA: A prototype implementation of a system of network progressive transmission of medical digital images☆

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ABSTRACT

In this paper, a prototype for progressive transmission of medical digital 2D images through the network, called CASANDRA, is presented. The prototype consists of the server part and the client part. In the server part, the images are acquired, stored, computed their wavelet transform and the wavelet coefficients stored, then transmitted progressively, when required, via TCP to the client. In the client part, with the inverse wavelet transform, the received wavelet coefficients are used to build successive improved reconstructions of the image.This prototype has been implemented and is being tested in the Radiotherapy Service of the Valencia University Hospital (Valencia, Spain).

1. Introduction

The recent advances in medical images have generated a bigger necessity than ever for techniques of effective compression and transmission. The main problem in digital images of great volume in general, and in the medical images in particular, is how to manipulate these quantities of increasing data. Their sizes generate problems in transmission, visualization, interaction and storing the results of the processing, and that is the center of a diversified area of active research.

Taking into account the large number of patients to be subject daily to computed tomographies (CT), magnetic resonances (MR), positron emission tomographies (PET), ultrasound scans, etc., the data quantity generated in a hospital may be enormous. This data goes through the hospital network from an image server to the office department where the images are visualized by the physician in order to make a correct diagnosis. In practice, large amounts of data going through the hospital network, provokes traffic slow down, break down (few seconds or minutes), affecting all users, unless there is a separate network only for radio-diagnostics. Also, it is inconvenient for sharing data amongst hospitals, because a physician may have severe problems to check some CT images of a patient from home or helping a colleague in another hospital, in a reasonably short time.

A technique that provides an efficient way to, first, compress the image (for storing and transmitting) and second, visualize (reconstructing from its compressed form), is the progressive transmission [1]. Progressive transmission is based on the transmission of data of the compressed image such that the client can, from the beginning, be able to make

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