Subject: Re: Medical Imaging Question
Posted by Larry Busse on Fri, 06 Aug 1999 07:00:00 GMT
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David,

I'm no expert on DICOM but I've worked in enough Radiology departments to shed a little light on your question.

As you probably know, the DICOM standard was developed to allow the many different kinds of medical imaging equipment (CT, MRI, Ultrasound, Nuclear Medicine, etc.) to provide data in a format that could be handled by workstations and computer networks throughout hospitals. I think the notion of digitizing images to 12-bits (or 4096 gray levels) was done to preserve the full dynamic range of older recording media such as x-ray film. The doctors basically didn't want to loose any information (contrast resolution or spatial resolution) just because the data was going to be digitized and sent over a computer network.

In MR and CT, images are usually displayed with a gray map that is appropriate for the particular area being imaged or diagnostic procedure. The look-up tables are sometimes referred to as "lung-window", or "bone-window", or "soft-tissue-window". These correspond to different window/level settings where
window = (WhiteValue - BlackValue) and
level = (WhiteValue + BlackValue)/2.

and the curve from black to white can be linear of some other curve. If the window is greater than 256 and the display only capable of 256 levels, then you won't see every level.

All this meant to say that I don't think it's necessary (or possible) to see 4096 shades of gray on the screen but it is important to preserve all the info in the data because looking for a tumor in the lung will require much different display settings that looking for a tumor in a bone.

I hope this helps. For more general info on DICOM try
http://www.rsna.org/REG/practiceres/dicom/

Good Luck,

David Fanning wrote:
>
> Mirko (mirko_vukovic@notes.mrc.sony.com) writes:
>
>> davidf@dfanning.com (David Fanning) wrote:
>>>

>>> I've got a 12-bit Dicom image. I want to display this in
>>> such a way that there is a direct correlation between
>>> the pixel value (0 to 4094) and the representation of
>>> that pixel value on the display. How do I do that?
>>>
>>
>> Can you please expand on that? What do you mean by direct correlation?
>> For a 4-bit image would color be a good correlation
>> (16 values <=> 16 colors/intensities)?
>
> I mean by this that I want to "see" 4094 shades of gray.
> Now I know there are only 256 "pure" shades of gray, so
> I presume that I have to fudge a gray somehow. For example,
> the pure gray (128, 128, 128) could be fudged by something
> like (128, 128, 135). The latter is not really a gray, but
> it's almost gray and presumably it "looks" different than
> the pure gray. My question really boils down to this: Is there
> some standard way to "fudge" gray values between the pure
> gray values, so that it appears as though I have 4094
> shades of gray? And if so, what is the algorithm to
> go from the pixel representation on the display to the
> real pixel value?
>
> Cheers,
>
> David
>
> --
> David Fanning, Ph.D.
> Fanning Software Consulting
> Phone: 970-221-0438 E-Mail: davidf@dfanning.com
> Coyote's Guide to IDL Programming: http://www.dfanning.com/
> Toll-Free IDL Book Orders: 1-888-461-0155

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Larry Busse Phone: (606)344-9433
L.J.B. Development Fax: (606)341-8486
3384 Madison Pike mailto:larry@ljbdev.com
Fort Wright, KY 41017 http://www.ljbdev.com
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