Subject: Reading DICOM images
Posted by holgi0251 on Wed, 25 Jan 2006 11:40:11 GMT
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Hi,

I am trying to process DICOM-images of human lung tissue from a Siemens Multidetector CT-scanner. The gray-levels should range from -1000 HU to something like +2000. When I read the image slices ("im = read_dicom(filename, image_index=1) the grey levels are compressed to the range 0 ... 255. The situation slightly improves, when I predefine the variable by "im = fltarr(512,512)". But I still don´t get negative graylevels.

Who can help?

Subject: Re: Reading DICOM images
Posted by Peter Clinch on Wed, 25 Jan 2006 13:01:41 GMT
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holgi0251@lycos.de wrote:

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> Multidetector CT-scanner. The gray-levels should range from -1000 HU to
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> the variable by "im = fltarr(512,512)". But I still don´t get negative
> graylevels.

There are a few possible Gotchas in there. First up, there's actually no such thing as a "DICOM file": what DICOM specifies is what will come over a network connection when you ask for an image. Most people, understandably, store files as what would come over a connection in the same order, but there's no need to.

You need to know what the file description says is specified. CT data is often pulled in from the basic hardware as 12 bit unsigned integers which gives you a 4K range but will obviously /not/ allow for negative numbers. Because the data is inherently digital it's quite unlikely to be in a floating point representation, and it is entirely likely the actual stored value is an unsigned or always positive integer that you'll need to window to get the right HU value.

You may need to do a little hacking to see what the data representation really is. It's not /too/ hard to work through a DICOM header and look around, but that does assume you're happy doing a bit of low level byte

to byte parsing.

Pete.
--
Peter Clinch Medical Physics IT Officer
Tel 44 1382 660111 ext. 33637 Univ. of Dundee, Ninewells Hospital
Fax 44 1382 640177 Dundee DD1 9SY Scotland UK
net p.j.clinch@dundee.ac.uk http://www.dundee.ac.uk/~pjclinch/

Subject: Re: Reading DICOM images
Posted by Jeff N. on Wed, 25 Jan 2006 14:37:03 GMT
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See if this page tells you want you want:
http://www.dfanning.com/fileio_tips/hounsfield.html

holgi0251@lycos.de wrote:
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Subject: Re: Reading DICOM images
Posted by Mike[2] on Wed, 25 Jan 2006 20:27:24 GMT
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DICOM image data is stored as integers. To scale them to the
appropriate units, you can use the following function. (This will work
for any DICOM image)

```
function rescaled_dicom_image, filename
;; rescaled_dicom_image: load a single dicom image slice from filename
;; and rescale it with rescale slope and intercept.
dcm = obj_new('IDLffDICOM')
dcm->Reset
var = dcm->Read(filename)
```

```
rescale_slope = *(dcm->GetValue('0028'x,'1053'x))[0]
rescale_intercept = *(dcm->GetValue('0028'x,'1052'x))[0]
img = float(*(dcm->GetValue('7fe0'x,'0010'x))[0]) * rescale_slope +
rescale_intercept
obj_destroy, dcm
return, img
end
```

This will give you a properly scaled image for for almost all DICOM data. I think that this is always in HU for CT image data, but YMMV on that. For some modalities, you can find the units of the image values as well. For example, for PET data, you can learn the units from the NMI Units (0054,1001).
