ConvertToDicom

A program to convert image files to DICOM format on OS X

Version 1.0 (beta)

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1 Summary

ConvertToDicom is a program for OS X (10.9 or greater) that reads in a series of image files in many different formats and creates a series in DICOM format. The input files can be in any format supported by the the Insight Toolkit (ITK[1]). Currently ITK version 4.8 is contained within *ConvertToDicom*.

The input is the name of a directory which contains a series of image files. It is assumed that the logical series order is the same as alphabetical order. All of the images must have the same pixel dimensions and should be of the same type. They can even be DICOM images[2].

The output is a directory tree containing the image series as 2D slices. The viewer will reassemble the 3D volumes as needed.

2 Using *ConvertToDicom*

2.1 Main window

The application opens with controls to let you select the input directory and the output directory. You can open a dialog in which you set the characteristics of the output series and when ready, you tell *ConvertToDicom* to do the conversion.

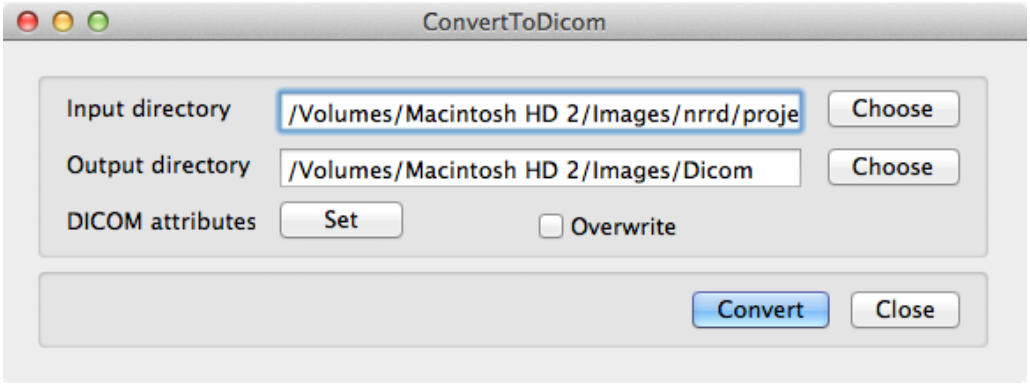

Figure 1: Main window.

2.1.1 Input directory

The directory containing the input image files. This directory can contain nothing but the file(s) containing the image series that you wish to convert and can contain only one image series. The files should have the same dimensions (pixel and physical) and be of the same type. That is, they should be the output of a single imaging experiment.

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1 http://itk.org Please check the documentation for the list of files which are supported.

2 Why would you want to 'convert' DICOM images? There may be times when you want to change the metadata or the series structure and this may be the easiest way of doing it. The metadata that are contained in the original files will be lost and will be replaced with *ConvertToDicom*'s metadata.

2.1.2 Output directory

The directory which will contain the DICOM (output) files. This directory actually contains the start of a directory tree with subdirectories with descriptive names.

```
Output directory/PatientName/StudyDescription - StudyID/SeriesDescription – SeriesNumber/
```

Figure 2: Output directory structure.

The DICOM files are stored in the deepest subdirectory each of which can contain only one series. However, a number of series can be stored under one study and a number of studies can be stored under one patient. The components of the directory tree, `PatientName`, `StudyDescription`, `StudyID`, `SeriesDescription and SeriesNumber`, are set in the DICOM Attributes window (see below).

2.1.3 Overwrite

ConvertToDicom will not normally allow you to overwrite the output files. However, you may want to change a parameter and convert the series again. If you check this box all existing files in the series directory will be deleted before the new ones are written.

2.1.4 DICOM attributes

Press the Set button to open the window which is used to set the attributes of the output files. This is optional but you will almost certainly want to set some of the attributes.

2.2 DICOM Attributes, Patient tab

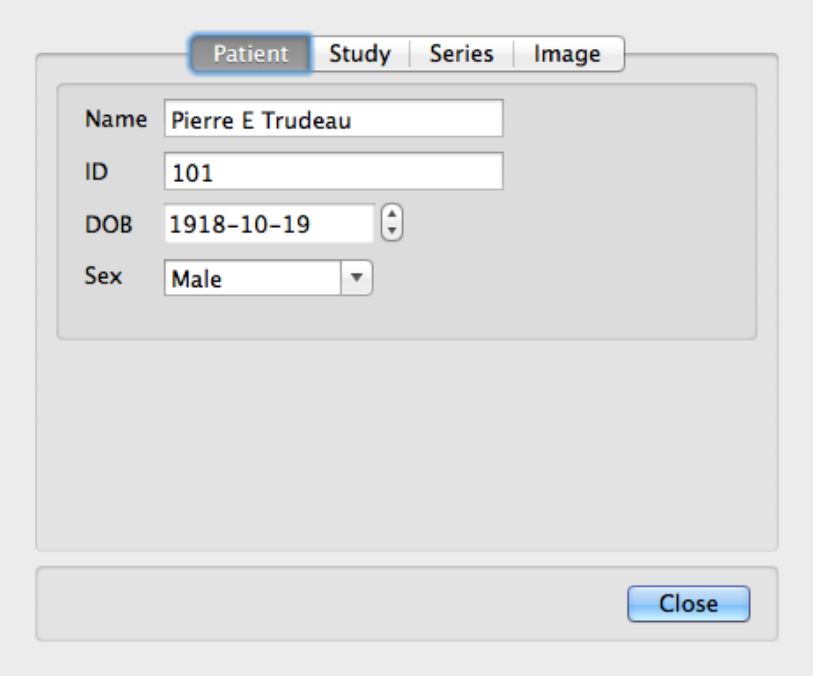

Figure 3: DICOM attributes for the patient.

2.2.1 Name

DICOM attribute (0010,0010) *Patient's Name.* The name of the patient. It is used to create the first level in the output directory tree.

2.2.2 ID

DICOM attribute (0010,0020) *Patient ID*. The patient identifier. This is an arbitrary number assigned to the patient.

2.2.3 DOB

DICOM attribute (0010,0030) *Patient's Birth Date*. The patient's date of birth.

2.2.4 Sex

DICOM attribute (0010,0040) *Patient's Sex*. The patient's sex.

2.3 DICOM Attributes, Study tab

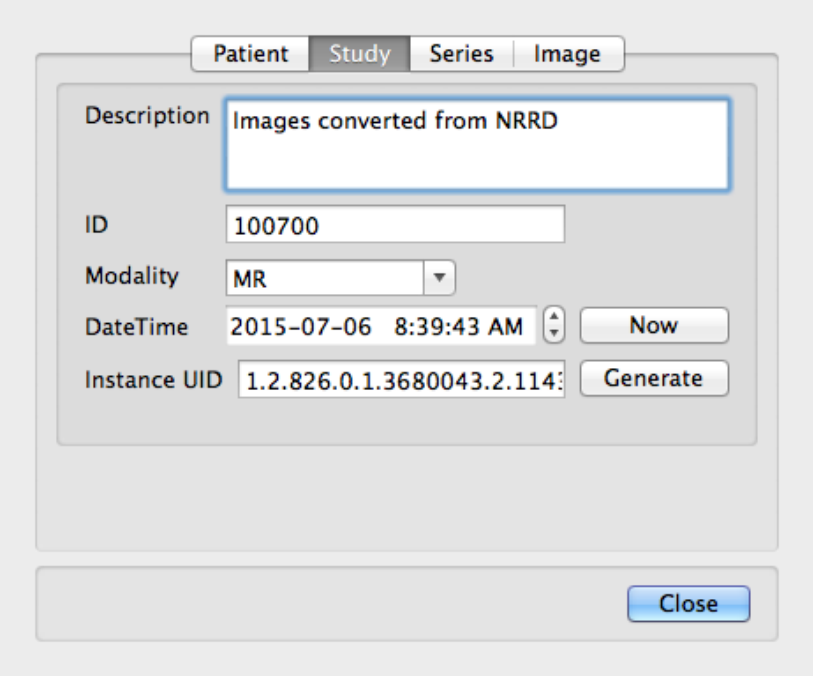

Figure 4: DICOM attributes for the study.

2.3.1 Description

DICOM attribute (0008,1030) *Study Description*. The study description. This can be anything the user wishes.

2.3.2 ID

DICOM attribute (0020,0010) *Study ID*. The study identifier. This is an arbitrary number assigned to the study.

2.3.3 Modality

DICOM attribute (0008,0060) *Modality*. The imaging modality. Select the modality from the list.

2.3.4 DateTime

DICOM attribute (0008,0020) *Study Date* and DICOM attribute (0008,0030) *Study Time*. The study date and time. Use the Now button to set this to the current date and time.

2.3.5 Instance UID

DICOM attribute (0020,000d) *Study Instance UID*. A unique identifier for the Study. The DICOM image viewer will probably use this to sort images so all images from the same study should share this value. Use the Generate button to make a new one if needed.

2.4 DICOM Attributes, Series tab

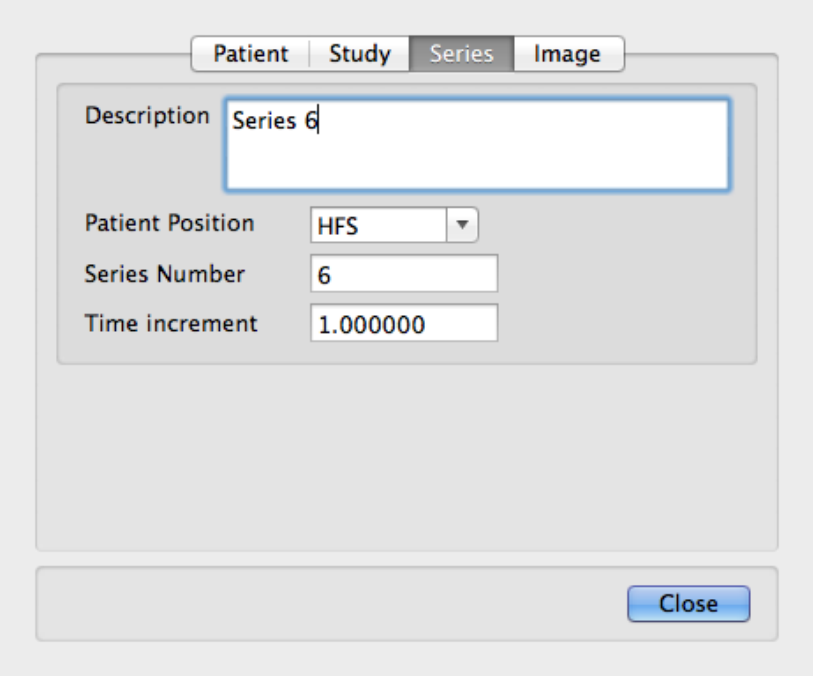

Figure 5: DICOM attributes for the series.

2.4.1 Description

DICOM attribute (0008,103e) *Series Description*. The series description. This can be anything the user wishes.

2.4.2 Patient Position

DICOM attribute (0018,5100) *Patient Position*. Select the correct value from the list.

2.4.3 Series Number

DICOM attribute (0020,0011) *Series Number*. An arbitrary number to identify the series.

2.4.4 Time Increment

DICOM attribute (0008,0032) *Acquisition Time.* If the images are a time series, this is used to calculate the image acquisition times. The study time is taken as the acquisition time of the first image. The value is in seconds. If the images do not form a time series, set this to 0.0.

2.5 DICOM Attributes, Image tab

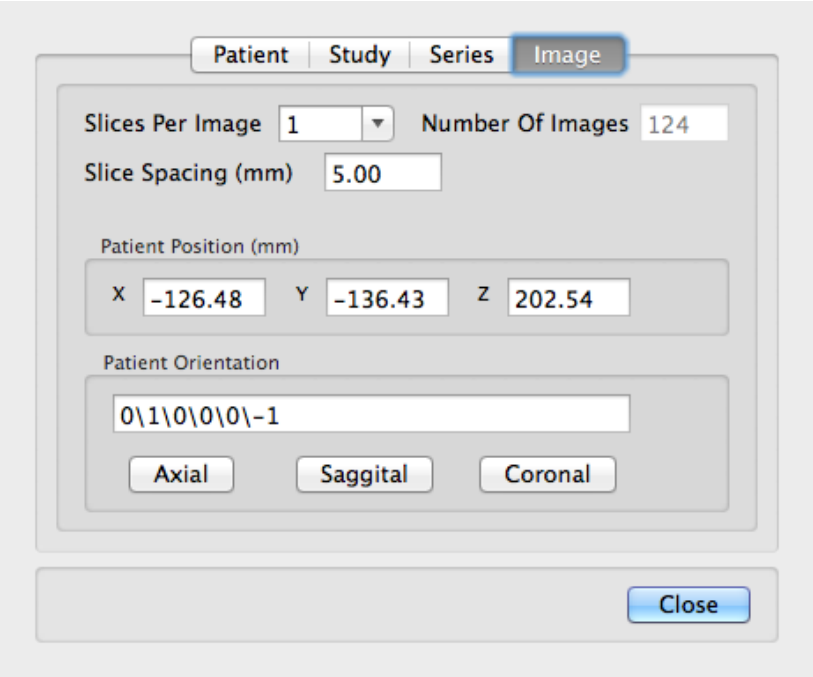

Figure 6: DICOM attributes for the images.

2.5.1 Slices Per Image *and* Number of Images

When the DICOM output is created, it is written as a series of 2D slices with the logical order of the slices reflected in their file names when listed in alphabetical order. The metadata contained in these files is used by the image viewer to assemble the series as 2D images, 3D images or perhaps as a time series.

When an image series is read it is stored as a series of 2D slices regardless of its original structure. For instance, a series of 10 3D images, each containing 5 slices, would be stored internally as a stack of 50 2D images. You will probably want to retain the input structure in the output and select 5 for this parameter.

However, the input series may not contain the necessary metadata or you may want to restructure it. In this case you can select the number of slices that should be in each image. The number of slices per image must be a factor of the total number of slices. Otherwise, the last image would not have enough slices. This list contains the factors of the total number of slices which in this case is 1, 2, 4, 31, 62 and 124. The Number Of Images entry shows the number of images that will be in the output and is for information only. In this case (Figure 6) the values corresponding to the Number Of Images selections would be 124, 62, 31, 4, 2 and 1.

2.5.2 Slice Spacing

DICOM attribute (0018,0088) *Spacing Between Slices*. This is the inter-slice spacing. It is useful

only if the series contains 3D images.

2.5.3 Patient Position

DICOM attribute (0020,0032) *Image Position Patient*. These are the three components of the position of the upper left corner of the image with respect to the patient.

2.5.4 Patient Orientation

DICOM attribute (0020,0037) *Image Orientation Patient*. This specifies the direction cosines of the first row and the first column with respect to the patient. The numbers can be entered directly or you can press the Axial, Saggital or Coronal button to set it to one of these common orientations.