

Dicom Toolkit 0.3.0

Dicom File I/O for GNU Octave.

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1 Installing and loading

The Dicom toolkit must be installed and then loaded to be used.

It can be installed in GNU Octave directly from octave-forge, or can be installed in an off-line mode via a downloaded tarball.

The toolkit has a dependency on the GDCM library (<https://http://gdcm.sourceforge.net/>), so it must be installed in order to successfully install the Dicom toolkit.

For fedora: `yum install gdcm-devel`

For ubuntu: `apt install libgdcm2-dev`

The toolkit must be then be loaded once per each GNU Octave session in order to use its functionality.

1.1 Online Direct install

With an internet connection available, the Dicom package can be installed from octave-forge using the following command within GNU Octave:

```
pkg install -forge dicom
```

The latest released version of the toolkit will be downloaded and installed.

1.2 Off-line install

With the Dicom toolkit package already downloaded, and in the current directory when running GNU Octave, the package can be installed using the following command within GNU Octave:

```
pkg install dicom-0.3.0.tar.gz
```

1.3 Loading

Regardless of the method of installing the Dicom toolkit, in order to use its functions, the toolkit must be loaded using the pkg load command:

```
pkg load dicom
```

The toolkit must be loaded on each GNU Octave session.

2 Basic Usage Overview

Dicom files consist of metadata and image data within a file. The Dicom toolkit provides functions to read and write dicom data.

```

%% read the meta information from a dicom file
> info = dicominfo ('test.dcm');
info =
    scalar structure containing the fields:
        Filename = a.dcm
        FileModDate = 04-Feb-2017 02:08:31
        FileMetaInformationVersion =
            0 1
        MediaStorageSOPClassUID = 1.2.840.10008.5.1.4.1.1.7
        MediaStorageSOPInstanceUID = 1.2.826.0.1.3680043.2.1143.4379544382488839209812957878553810312
        TransferSyntaxUID = 1.2.840.10008.1.2
        ImplementationClassUID = 1.2.826.0.1.3680043.2.1143.107.104.103.115.2.6.3
        ImplementationVersionName = GDCM 2.6.3
        SourceApplicationEntityTitle = GDCM
        ImageType = DERIVED \SECONDARY
        SOPClassUID = 1.2.840.10008.5.1.4.1.1.7
        SOPInstanceUID = 1.2.826.0.1.3680043.2.1143.4379544382488839209812957878553810312
        StudyDate = 20170203
        StudyTime = 210831.360586
        Modality = OT
        ConversionType = WSD
        NominalScannedPixelSpacing =
            1
            1
        StudyInstanceUID = 1.2.826.0.1.3680043.2.1143.1282184104726305239898701219563360204
        SeriesInstanceUID = 1.2.826.0.1.3680043.2.1143.938526508174485815508079931697619862
        SamplesPerPixel = 1
        PhotometricInterpretation = MONOCHROME1
        Rows = 10
        Columns = 5
        BitsAllocated = 8
        BitsStored = 8
        HighBit = 7
        PixelRepresentation = 0
        RescaleIntercept = 0
        RescaleSlope = 1
        RescaleType = US
        PixelData = not assigned

%% read the image data
> image = dicomread('test.dcm')
image = dicomread ('a.dcm')
image =
    0 0 0 0 0
    0 0 0 0 0
    0 0 0 0 0

```

```
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
0 0 0 0 0
```

Help for each function can be displayed by `help thefunctionname`
ie:

```
help dicominfo
```

3 Function Reference

The functions currently available in the Dicom toolkit are described below;

3.1 Dicom Functions

3.1.1 dicomdict

`dictionary_name = dicomdict (get)` [Loadable Function]
`dicomdict (factory)` [Loadable Function]
`dicomdict (set, dictionary_name)` [Loadable Function]

Get or set the active dicom data dictionary.

The first usage returns the filename of the dictionary that is currently being used. Using `factory` resets the dictionary to the default. Using `set` allows setting the dictionary for future operations. In this case, the dictionary file *dictionary_name* can be anywhere in the path.

See also: `dicomread`, `dicomwrite`.

3.1.2 dicomdisp

`dicomdisp (filename)` [Loadable Function]
`dicomdisp (filename, [propertyname, propertyvalue ...])` [Loadable Function]

Read and display the metadata from a DICOM file.

filename - dicomfilename to display.

propertyname, *propertyvalue* - property pairs for options to the display function.

Currently the only known property is 'dictionary' to specify a non default dict to use.

See also: `dicomread`, `dicominfo`.

3.1.3 dicominfo

`info = dicominfo (filename)` [Loadable Function]
`info = dicominfo (filename, dictionary, dictionary-name)` [Loadable Function]
`dicominfo (filename, options)` [Loadable Function]
`dicominfo filename` [Command]
`dicominfo filename options` [Command]

Get all data from a DICOM file, excluding any actual image. *info* is a nested struct containing the data.

If no return argument is given, then there will be output similar to a DICOM dump.

If the `dictionary` argument is used, the given *dictionary-name* is used for this operation, otherwise, the dictionary set by `dicomdict` is used.

options: `truncate=n` where *n* is the number of characters to limit the dump output display to *n* for each value.

See also: `dicomread`, `dicomdict`.

3.1.4 dicomlookup

`keyword = dicomlookup (group, element)` [Loadable Function]
`[group, element] = dicomlookup (keyword)` [Loadable Function]

Lookup an attribute in the DICOM data dictionary.

`keyword = dicomlookup (group, element)` will look in the current dicom dictionary for a specified *group* and *element* tag and returns string name of the attribute.

[*group*, *element*] = `dicomlookup` (*keyword*) will look in the current dicom dictionary for a specified *keyword* string and returns the *group* and *element* for keyword.

See also: `dicomdict`.

3.1.5 `dicomread`

`image = dicomread(filename)` [Loadable Function]

`image = dicomread(structure)` [Loadable Function]

Load the image from a DICOM file. *filename* is a string (giving the filename). *structure* is a structure with a field `Filename` (such as returned by `dicominfo`). *image* may be two or three dimensional, depending on the content of the file. An integer or float matrix will be returned, the number of bits will depend on the file.

See also: `dicominfo`.

3.1.6 `dicomuid`

`uuid = dicomuuid()` [Loadable Function]

Generate a DICOM unique id .

uuid is a unique id string.

3.1.7 `dicomwrite`

`dicomwrite(im, filename)` [Loadable Function]

`dicomwrite(im, filename, info)` [Loadable Function]

Write a DICOM format file to *filename*.

im is image data or empty matrix, [], if only metadata save is required *filename* is filename to write dicom to. if [], then function runs in verbose trial mode. *info* struct, like that produced by `dicominfo`

See also: `dicomread`, `dicominfo`.

3.1.8 `isdicom`

`isdicom(filename)` [Loadable Function]

Return true if *filename* is a valid DICOM file.

See also: `dicomdict`, `dicominfo`, `dicomread`, `dicomwrite`.

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Version 3, 29 June 2007

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