

The Tudor Dicom Tools

The Tudor DICOM Tools are a Java library to perform high-level DICOM operations. It is based on dcm4che version 2, the Java Advanced Imaging API (JAI) and ImageJ. The library includes stand-alone applications as well as ImageJ plugins. It can be used as a library in own custom applications as well. It offers functionality to read and write DICOM files from a disc or a DICOMDIR file-set (e.g. DICOM CD), work with the DICOM header, anonymize images and send, receive or query images from a Picture Archiving and Communication System (PACS) via network. The following DICOM network services are provided by the tools: C-ECHO-SCU/SCP, STORAGE-SCP, QUERY/RETRIEVE-SCU. Additionally it offers components to view DICOM images with features like windowing, zooming, shifting, measuring etc.. Most of the included functionalities can be used in ImageJ macros. You can explore how to use them by using the macro recorder of ImageJ.

The Tudor DICOM Viewer started as a tech-demo of all features provided in the TUDOR DICOM Tools. With the time it evolved to a simple, but yet usefull DICOM viewing application. The viewer is able to display multiple images in several splitscreen or multi-monitor configurations. Multiple series can be loaded and managed in the viewer from different available sources. As the viewer allthough contains the complete DICOM open dialog with the integrated store and send functionalities it can be used not only to view images, but to retrieve images from one modality, store them into a DICOMDIR that can be burned as DICOM CD or send them to another DICOM capable modality.

The software distributed under the LGPL license - Copyright 2010 Tudor/Santec.

PLEASE MENTION: The TUDOR DICOM Tools are not intended for doing medical diagnosis

- **Version 1.9.30 has been released - (2016.01.22)** [Download](#)

- New Java Certificate

- Version 1.9.23 has been released - (2014.03.11)
 - New Java Certificate
- Version 1.9.22 has been released - (2013.11.27)
 - New Image Loading mechanism with SETTING to load via ImageJ or Loci-Tools
- Version 1.9.21 has been released - (2013.09.06)
 - Enhancements in Query/Retrieve
- Version 1.9.20 has been released - (2013.08.23)
 - new DICOM Query
- Version 1.9.18 has been released - (2013.05.23)
 - Bugfixes in Header-Data Evaluator, DICOM Filter
- Version 1.9.17 has been released - (2013.05.13) Small bugfixes, Option Copy-Files in Header-Data Evaluator.
- Version 1.9.15 has been released - (2013.02.22) Several Bugfixes. Option for Multislice Export in the Save_As_Dicom IJ Plugin.
- Version 1.9.14 has been released - (2012.07.19) Updated to dcm4che 2.0.26.
- Version 1.9.13 has been released - (2012.06.27) Truncate header fields to 200chars when exporting to CSV files for Excel etc.. compatibility.
- Version 1.9.12 has been released - (2012.06.25) Save directly to file option in Headerdata extractor
- Version 1.9.11 has been released - (2012.06.20) Windows Executables for more Memory (1gig/2gig instead of 512 as default) Bugfixes in Headerdata extractor

- Version 1.9.10 has been released - (2012.06.12) Bugfixes in Headerdata extractor
- Version 1.9.9 has been released - (2012.04.06) Stack export changes to single files, small bugfixes etc...
- Version 1.9.8 has been released - (2012.03.08) Small bugfixes
- Version 1.9.7 has been released - (2012.03.02) Bugfixing in series opening, added jai_imageio to webstart version
- Version 1.9.6 has been released - (2012.02.22) Updated JAI and Loci tools for opening compressed images.
- Version 1.9.5 has been released - (2012.02.01) integrated ImageJ 3D Viewer if Java 3D is installed.
- Version 1.9.1 has been released - (2011.08.26) bugfixes on ImageJ Plugins.
- Version 1.9 has been released - (2011.08.16) Enhanced Anonymizer/Stripper, small bugfixes
- Version 1.8 has been released - (2010.12.22) fixed image order when loading series, some small bugfixed and adoptions for smaller screens.
- Version 1.7 has been released - (2010.09.22) configurable dicom tags shown in viewer
- Version 1.6 has been released - (2010.06.21) Updated dcm4che libs
- Version 1.5 has been released - (2010.05.20)
 - improved exporting functionalities like MULTIFRAME stack export, RGB and MONOCHROME2 - thanks to David Pinelle, University of Saskatchewan
 - added Italian and Spanish translations - thanks to Dante Brunini, Juan Miguel Boyero Corral and dgilperez
- Version 1.3.1 has been released - (2009.12.15) fixed dicomdir erasing behaviors
- Version 1.3 has been released - (2009.08.14) fixed multislice opening
- Version 1.2 has been released - (2009.08.10) fixed opening of some images, fixed some header issues
- Version 1.1 has been released - (2009.07.09) Query by patient-id, measure histogram on roi/image, hierarchical DICOM header, API changes for header handling.
- Version 1.01 has been released - (2009.06.24) Lots of new features.
- Version 0.9.3 has been released - (2009.02.10) fixed sending of multiple files.
- Version 0.9.1 has been released - (2009.01.29) fixed DICOM-CD on Mac/Linux.

Features

- **Viewing images** The Toolkit offers components to view DICOM images with features like windowing, zooming, shifting, measuring etc. The Tudor DICOM Viewer, a simple but yet powerful DICOM viewer application is able to display multiple images in several splitscreen or multi-monitor configurations. Multiple series can be loaded and managed in the viewer from different available image sources.
- **Opening and writing** The toolkit offers functionality to read DICOM files in various image compressions and formats from a disc or DICOMDIR fileset (DICOM CD). Images from any kind can be saved as uncompressed DICOM files. It is easy to create a lightweight, but standard conform STORAGE-SCP that is able to receive DICOM objects via network and store them into a DICOMDIR file-set or directory
- **Sending and receiving** DICOM objects can be queried from a PACS by their patient name, study, series and image UID using the integrated QUERY/RETRIEVE-SCU. A DICOM sender (STORAGE-SCU) can be used to send images to any configured DICOM node in the network.
- **DICOM header handling** It is possible to change the DICOM metadata for example to anonymize images or fix metadata related problems. Header data can be used in conditions to take decisions depending on the provided data. Headers can be viewed as text or hexadecimal values for debugging purposes. A comparison of headers from different files is possible too.

Screenshots



OnlineDemo

just try out our online demo version via Java-Webstart:

[Start DicomViewer using Java-Webstart](#)

Requires at least Java 8u50

Download

[Download the Tudor DICOM Tools and the Tudor DICOM Viewer](#)

Installation

The software needs at least version 1.5 of the Java Runtime Environment (JRE), due to the compatibility of external libraries. The installation of the Tudor DICOM Tools is quite easy:

- **Download the package.**
- For the **Tudor DICOM Viewer**:
 - Unpack the archive and use the .exe or .sh file to start the Viewer.
- For the **Tudor DICOM Plugins**:
 - Unpack the archive in the ImageJ directory. All files will be copied to the correct locations. The archive contains external libraries in the plugins/TudorDICOMLibs folder and the plugin jar in plugins/TudorDICOM_Plugin.jar
- For the **Tudor DICOM Sources**:
 - Import the src package into any Java development tool, e.g. Eclipse and then link all libraries from the tudordicom_plugin_1.6.zip EXCEPT the lu.tudor.santec.dicom.jar (which contains is the same classes as the src code) to it.

Please download and install the Java ImageIO to be able to read compressed DICOM files:

Download:

<http://download.java.net/media/jai-imageio/builds/release/1.1/>

Installation:

<http://www.oracle.com/technetwork/java/install-jai-imageio-1-0-01-139659.html>

Documentation

- [ImageJConf 2008 Paper](#) Taken from the ImageJConf 2008 proceedings
- [Verarbeitung von DICOM Daten mit ImageJ](#) GERMAN

The following libraries are used to build and run this project:

- imagej: Image Processing and Analysis in Java, distributable under public-domain, Rasband, W.S., ImageJ, U. S. National Institutes of Health <http://rsb.info.nih.gov/ij/>
- dcm4che2: An Open source DICOM Toolkit, distributable under LGPL license Copyright 2002, 2003 by TIANI MEDGRAPH AG <http://sourceforge.net/projects/dcm4che/>
- FormLayout: Build better screens faster, distributable under BSD Licence Copyright 2003
- Jgoodies <http://www.jgoodies.com/freeware/forms/>
- L2FProd.com: Common Components (Button Bar), distributable under SkinLF License, <http://www.l2fprod.com/>
- lu.tudor.santec.settings: Framework to load, store and edit settings, distributed under the LGPL license - Copyright 2005, Centre de Recherche Public HENRI TUDOR - SANTEC Luxembourg <http://santec.tudor.lu/>

Contribute

If you are interested to have a localized version of the Tudor DICOM Tools which is not available now. You can help us to translate it to your native language.

- [The translation files for the DICOM Viewer](#)
- [The translation for a the Settings-library](#)

References

The TUDOR DICOM Tools are used in the follwing of our software projects:

- [Optimage - Optimal Image Quality for Modalities](#)
- [GECAMed - Gestion de Cabinets Médicaux](#)
- [Dose DEO](#)

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