web page draft for ctFIRE

ctFIRE (curvelet transform and FIb

Overview

Main Developers:

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The purpose of this standalone MATLAB package is to allow users to automatically extract and quantify the alignment of collagen fibers in an image. The program reads in image files, extracts the individual collagen fibers via ctFIRE ( curvelet transform plus FIRE algorithm) , which is an approach combining the advantage of the fast discrete curvelet transform[1] for denoising the image and enhancing the fiber edge features and the advantage of FIRE algorithm [2] for extracting individual fibers, and returns the segmented fibers along with descriptive statistics, such as fiber angle and length histograms as well as other optional outputs. The output may be displayed on the screen and/or written to .xlsx , .tif or .mat files.

In the ctFIRE program, the user can choose to run FIRE, ctFIRE or both of them. Parameters to run FIRE and ctFIRE have default values and are also adjustable via GUI . Optional outputs include: overlaid image of the segmented fibers on the original image and the CT reconstructed image, figure of the fiber angle histogram, figure of the fiber length histogram, or fiber angle value and fiber length value spreadsheets. The detailed information about the parameters and output of ctFIRE is automatically saved in .mat binary format for a later post-processing.

Download

Language:

MATLAB

Latest Version:

February 2013

Download:

[Standalone application for Windows](http://loci.wisc.edu/files/loci/software/CurveAlign_PC_pkg.exe)

[MATLAB m-files](http://loci.wisc.edu/files/loci/software/CurveAlign_Matlab.zip)

Instructions:

[IMPORTANT NOTE: Installing the MCR and MATLAB on the same machine](http://www.mathworks.com/access/helpdesk/help/toolbox/compiler/f12-999353.html" \l "br2jauc-33" \t "_blank)

### [Run compiled MATLAB applications or components without installing MATLAB](http://www.mathworks.com/products/compiler/mcr/)

**Standalone for Windows:**

1. Download and run ctFIRE\_PC\_pkg.exe

2. Install the MATLAB Compiler Runtime (MCR) using MCRinstaller.exe (included in package)

3. Add the MCR directory to the system path ([readme.txt](http://loci.wisc.edu/files/loci/readme_0.txt)) \*\*\* This step may be unnecessary for some systems

4. Run the ctFIRE\_PC.exe

**MATLAB version:**

Download and unzip the file ctFIRE\_MATLAB.zip. Then (1) go to [curvelet.org](http://curvelet.org/register.html) and register to sign a licensing agreement and download the CurveLab 2.1.2 MATLAB package and unzip it; (2) go to <http://www.ima.umn.edu/~astein/Andrew%20Stein/Software.html> to download FIRE(FIbeR Extraction) software. Place the three unzipped folders i.e. ctFIRE, CurveLab-2.1.2 and FIRE into the same folder. With MATLAB's Current Folder set to the ctFIRE folder, enter "ctFIRE" at the command prompt to launch the GUI.

Installation and Usage:

[**Download the Users Manual for full operating instructions**](http://www.loci.wisc.edu/files/loci/software/curvelets_user_guide.pdf)

More Information

Source Code:

[ctFIRE](https://github.com/uw-loci/curvelets/tree/master/ctFIRE)

Website:

[Curvelet Transform](http://curvelet.org/)

[FIbeR Extraction](http://www.ima.umn.edu/~astein/Andrew%20Stein/Software.html)

[1] “curvelet toolbox,” <http://www.curvelet.org/software.html> (19 July 2012).

[2] A. M. Stein, D. A. Vader, L. M. Jawerth, D. A. Weitz, and L. M. Sander, “An algorithm for extracting the network geometry of three-dimensional collagen gels,” *Journal of Microscopy* **232**(3), 463–475 (2008) [doi:10.1111/j.1365-2818.2008.02141.x].