

Free-D v1.14 (2017.02.20)

Added features

- Add the possibility to continue from any position the drawing of a pre-existing contour
- Add algorithm for reconstructing the 3D triangulated surface of branched structures
- Add the possibility to label contours as corresponding to the beginning/end of a structure
- Add visual display of the eraser size when removing points from existing items
- Extended image cache capacity providing increased fluidity when browsing slices
- Add copy/paste (CTRL-C, CTRL-V) of contours within and between slices

Modified/corrected features

- Fix bug that made the bounding box invisible in 3D renderings with dark backgrounds
- Faster navigation through slices when in 'items only' display mode (no image loading)
- Increased fluidity in the display of triangular meshes
- Fix symbol size issue in the 3D rendering of spatial normalization results

Removed features

- Remove CTRL-C as shortcut for closing the current stack

Free-D v1.13 (2016.07.28)

Added features

- Two new rendering modes based on surface triangulation (previously, only quadrangulation was available in the distributed version)
- First plug-in made available: MorphoLeaf (<http://morpholeaf.versailles.inra.fr>)

Modified/corrected features

- Fix bug in plug-in management system
- Fix bug on image pathnames in the Windows32 version
- Fix bug causing incorrect display of contours thickness in some circumstances

Free-D v1.12 (2016.03.18)

Added features

- Reassignment of the origin (first point) in an item (contours and sets of points)
- Split of an item into two or more items based on user defined cutting points
- Ruler tool to perform interactive length measurements on 2D images
- Option to set pixel calibration from image file calibration when creating a new stack
- Option to apply Fourier smoothing to all items of a same model throughout a stack
- Option to apply resampling to all items of a same model throughout a stack
- Option in Stack Properties dialog to invert Z axis
- Dialog for setting user preferences
- Preference option to change the background color
- Preference option to change the selection color
- Preference option to change the number of backup files upon stack saving
- Preference option to change the tolerance (distance) for item selection using left mouse click
- Preference option to display/hide labels with image information in panoramas (galleries)

- Preference option to automatically decimate manually drawn contour when they are created
- Support and menu for plug-ins

Modified/corrected features

- Selection rectangle appearance changed to transparent colored rectangle (was previously opaque in the Windows version)
- Selected items appear thicker (optional)
- Fix bug that caused the selected unit length being ignored upon stack creation
- Fix bug that caused a crash upon stack creation with non-handled image file types
- Fix implementation of kernel method in the statistical density mapping tool (normalization module)
- Fix bug in the registration module that generated blur for images with large pixel width/height

Free-D v1.11 (2015.03.06)

Added features

- 3D shape registration and averaging (new module)
- 3D shape non-linear normalization (new module)
- Statistical density mapping (new module)
- Automatic spot extraction in 3D image stacks
- Object filtering based on containment analysis
- Support for 16 bits images
- Export of surface models to the STL format
- Slice actions (properties edition, annotation) available from the contextual menu

Modified/corrected features

- Default tolerance in Douglas-Peucker decimation changed from 50 to 1
- Maximum zoom level in 3D renderings changed from 500 to 1000%

Free-D v1.10 (2014.02.20)

Added features

- Propagation of converged snake from slice to slice when running on every slice.
- Contour simplification by vertex decimation using the Douglas-Peucker algorithm.
- Slider in the toolbar for interactive adjustment of the image contrast.

Modified/corrected features

- A bug causing crash upon stack loading on KDE has been fixed.
- A bug causing infrequent crash when registering large slice images has been fixed.
- Flags for begin/end caps on model surfaces are now correctly saved in .sdf files.

Free-D v1.09 (2013.01.15)

Added features

- Interactive contour smoothing using Fourier descriptors.
- New stack property for using absolute or relative paths between stack and image files.
- New model attributes for closing 3D surfaces at their extremities (begin/end caps).

- Automatic animation of the rendering scene around the vertical axis.

Modified/corrected features

- Maximum thumbnail size in panoramas extended from 256 to 512.
- Vertex symbols (points, circles, etc.) can be made transparent when displayed over 2D images.

Free-D v1.08 (2012.01.20)

Added features

- Slices annotations and stacks annotations (text).
- Uniform resampling of contour vertices at user-defined point density levels.
- Drag-and-drop of SDF files for stack loading.
- Next/previous stack buttons in the 3D rendering windows for easy and fast browsing through the 3D reconstructions of multiple stacks.
- New web site, with some Free-D related tools available.

Modified/corrected features

- Fixed a bug that caused the application to ignore the 'Cancel' choice when closing with unsaved stack modifications.
- Various other minor bugs corrections.
- Various code optimizations.

Free-D v1.07 (2011.03.08)

Added features

- Free-D now available for Linux 64 bits (Ubuntu)

Modified/corrected features

- Fixed a bug in image display that could cause a crash when loading stacks or changing slices
- Various minor bugs corrections
- Various code optimizations

Free-D v1.06 (2010.03.15)

Added features

- A first version of the quantitative analysis module has been introduced.
- Models can be transferred between stacks (e.g., between different image channels).
- It is now possible to zoom out images at levels distinct from the fit-in-window mode.
- A slider has been added to browse through the slices of the current stack.
- Numbered backup versions of .sdf file are automatically generated when saving a stack.
- A vertex decimation function has been introduced to minimize the number of contour vertices.
- A length unit attribute has been introduced in the stack properties.
- Thumbnail image size in panoramas can be reduced/increased with Ctrl-L/Shift-Ctrl-L keys.

Modified features

- In vertex deletion mode, vertices can be deleted using continuous drag-and-move.

- Snake evolution is continuously displayed and can be interrupted using the Escape key.
- Image display at zoom levels below 100% in the main window is now anti-aliased.
- Image display in panoramas has been optimized.

Free-D v1.05 (2009.07.20)

Added features

- It is now possible to zoom in images at arbitrary levels.
- In parallel, an overview thumbnail window has been added.
- Thumbnail images in panoramas are now anti-aliased.
- A vertex edition tool bar has been introduced.
- The current pixel position and value(s) are now displayed in the status bar.
- The number of items in the current slice are now displayed in the status bar.
- A number of comfort features have been added (Close all, Open recent, etc.).

Modified features

- The image display module have been completely rewritten. It is now based on OpenGL and uses multi-threading. This results in a 50% decrease of memory usage, a significantly faster display, and an overall increased responsiveness of the software.
- Switching to panorama mode induces no freezing anymore; it is possible to switch back and forth with single-view mode before the panorama has been completely computed and displayed.
- Item drawing has been made more convenient: scrolling the view while drawing has been made easier (in particular, using arrow keys); it is also possible to zoom in/out without interrupting the drawing.
- Item vertex edition has been made more convenient and the distinction between normal mode and vertex edition mode should be clearer.

Removed features

- There is no magnification window anymore since zoom in/out is available from the main window itself.

Free-D v1.04 (2007.09.11)

Additions

- A scale parameter has been introduced in the configuration dialog of active contours (snakes). This feature allows running snakes on low magnification copies of images. This is in particular useful for the segmentation of large structures on very big images, for which the processing at full scale can be very time-consuming.
- The keyboard shortcut 'Ctrl-A' can now be used to select all the items on a given slice; this command is available in both the fit-in-window view of the main windows and the fullscale view of the associated magnification windows.
- A stack properties dialog is now available from the *Edit* menu; it allows interactively and dynamically changing the name of the current stack, the default inter-slice spacing as well as the default image calibration (pixel dimensions) throughout the stack. Previously, these operations could be done only by manually editing and then reloading the stack description file.
- A slice properties dialog is now available from the *Edit* menu; it allows interactively and dynamically changing the name of the current slice, its spacing from the previous slice in the

stack, as well as its calibration (pixel dimensions). Previously, these operations could be done only by manually editing and then reloading the stack description file. Slices for which the spacing and/or the calibration differ from the default values in the stack are marked with a grey square on the left of their name in the slice browser.

- Links to Free-D homepage and user manual are now available from the *Help* menu.

Modifications

- Symbol size in the 3D representation of cubes, diamonds, and tetrahedrons are now standardised. They are calculated to have the same volume as a sphere of radius given by the Symbol Size parameter.

Corrections

- A bug was generating an incorrect or even missing display of points when using symbol types diamond and tetrahedron. This has been corrected and all symbol types are now displayed correctly, both in 2D and 3D representations.
- Registration window: the bug that was causing a crash on some occasions when changing the magnification of the images (buttons Bigger/Smaller) has been corrected.
- The bug that sometimes was causing a seeming freezing of the application when changing the display mode in fit-in-window views (in particular if working with stacks of large images) has been corrected.

Free-D v1.03 (2007.01.16)

Additions

- A semi-automatic segmentation tool, based on automatic thresholding and contour following, has been added. It is available from the *Create->Automatic* item of the contextual menu in the fit-in-window view of main windows or fullscale view of the associated magnification windows.
- A semi-automatic segmentation tool, based on active contours (snakes), has been added. It is available from the *Edit->Run snake* item of the contextual menu in the fit-in-window view of main windows or fullscale view of the associated magnification windows.
- Item selection on an image can now be done by rectangle selection. Left-dragging the mouse draws a rectangular selection area within which all item points will be selected upon button release. This in particular allows to select parts of contours only and to delete them. Previously, this could be done only by removing each point one by one.
- In the registration window, the rotation angle can now be controlled using a spinbox, in addition to the mouse-driven rotation.
- In the registration window, three new modes are available to display the superimposition of the registered slices: subtraction, minimum, and maximum. Previously, only addition and multiplication were available.

Modifications

- Stack and slice browsing in the main windows has been made easier and more convenient. It is now based on two distinct lists, one displaying all loaded stacks, the other displaying the slices in the currently selected stack.
- The dialog for creating, editing, and deleting models has been redesigned and made more convenient and efficient. All model properties are now displayed in a unique panel. Multiple selection of models is also possible, allowing the simultaneous modification or deletion of

several models.

- Registration window: the precision of the rotation angle has been increased from 1 to 0.1 degree.

Corrections

- Registration window: the bug causing an apparent one-pixel large contraction of the foreground image at some rotation angles has been removed.