

Neuron3D Documentation

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Introduction.

Neuron3D exists as 2 tools:

- Neuron3D
- Neuron3D_Movie

Neuron3D is mainly used for looking at individual neurons in solid rendering.

Neuron3D_Movie is used for larger-scale networks and for creating POV-Ray movies of a series of neural networks, or just a movie in which the user moves about in a (single) neural network. Movies can be made from multiple files which for example represent a developmental process, for example 10 frames in which each frame represents a certain time point in development.

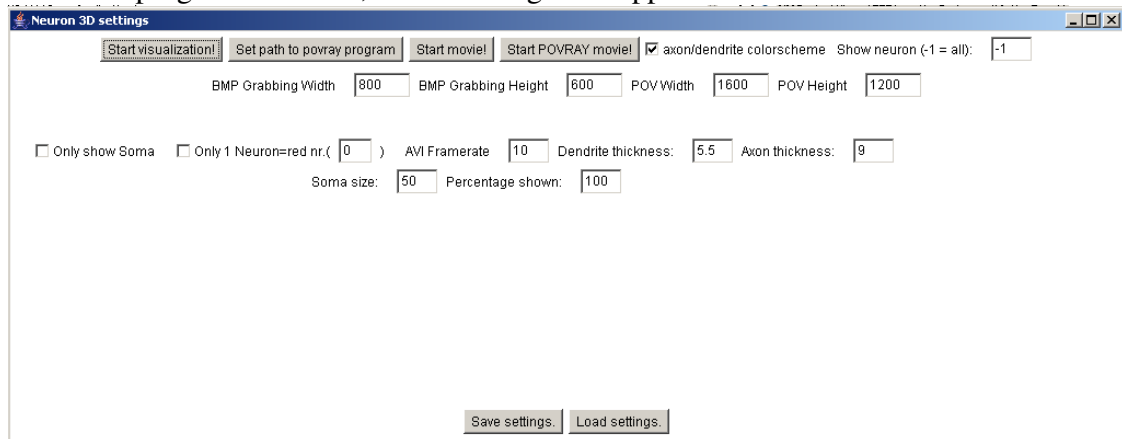
In both programs, snapshots can be made and also snapshots using POV-Ray can be made from a single situation.

The program which makes the snapshots and frames of the movie is called POV-Ray, which is freely downloadable.

Neuron3D_Movie is capable of creating an .AVI movie from the outputted .BMP's (the pictures created by POV-Ray are saved as .BMP's)

Neuron3D walk through:

When the program is started, the following form appears:



The screenshot shows the 'Neuron 3D settings' window. It contains several buttons and input fields. At the top, there are four buttons: 'Start visualization!', 'Set path to povray program', 'Start movie!', and 'Start POV-Ray movie!'. To the right of these buttons is a checked checkbox labeled 'axon/dendrite colorscheme' and a text box labeled 'Show neuron (-1 = all):' with the value '-1'. Below these are four input fields: 'BMP Grabbing Width' (800), 'BMP Grabbing Height' (600), 'POV Width' (1600), and 'POV Height' (1200). Further down, there are two checkboxes: 'Only show Soma' and 'Only 1 Neuron=red nr.(0)'. To the right of the second checkbox is an input field with the value '0'. Next to this is an input field for 'AVI Framerate' with the value '10'. Then there are two input fields: 'Dendrite thickness:' (5.5) and 'Axon thickness:' (9). Below these are two more input fields: 'Soma size:' (50) and 'Percentage shown:' (100). At the bottom right, there are two buttons: 'Save settings.' and 'Load settings.'.

If you haven't specified the path to the povray program (that is for example the location of the pvenGINE.exe file that comes with povray) do it first.

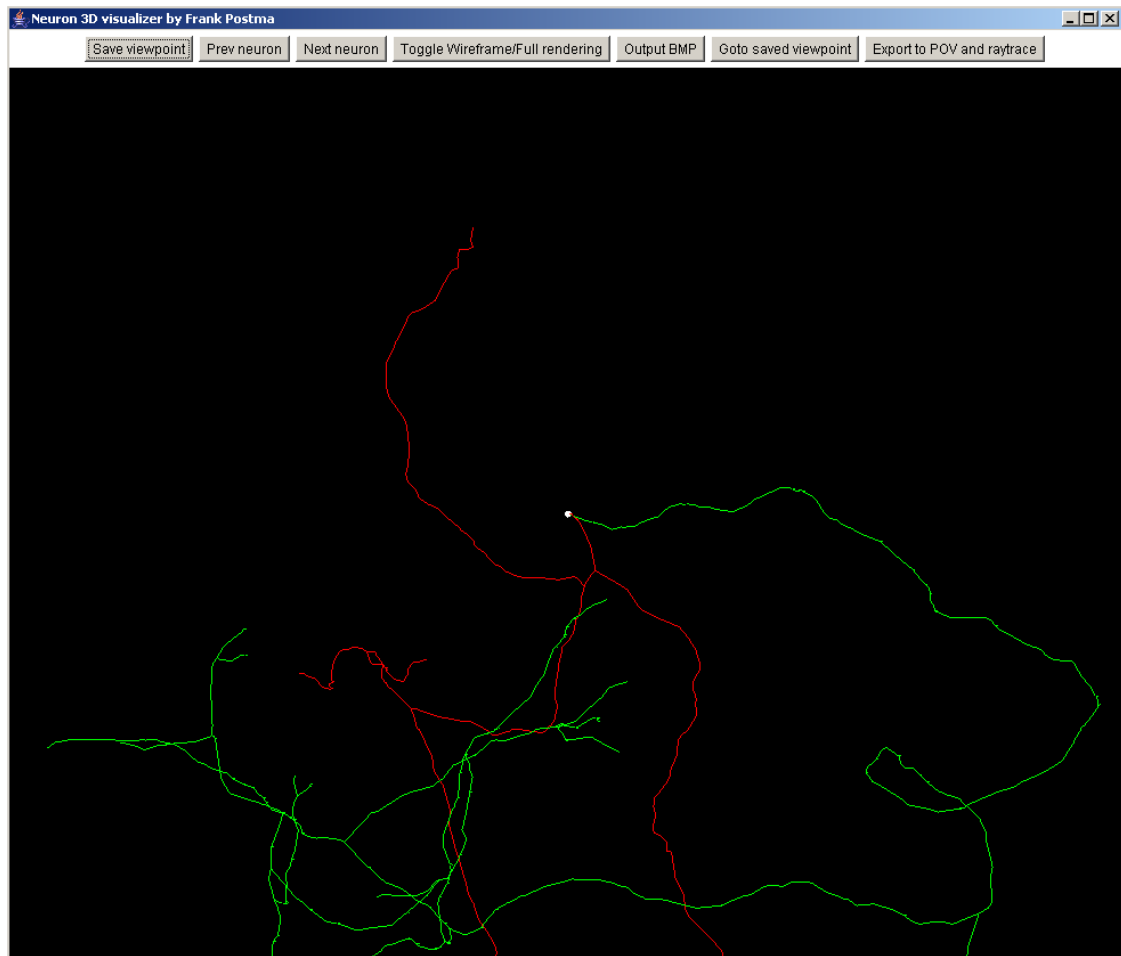
If you want to look at one neuron at a time, type 0 into the textbox next to "Show neuron".

You can save all your settings by clicking Save settings. When you choose the default, these settings will be loaded next time.

Then, when you want to start viewing your model, press Start visualization, and choose the netmorph output file of your choice.

Remember that Neuron3D is not intended to view very large scale networks at once, but rather to view a single neuron at a time of the (large scale) network.

The following screen, the rendering screen, appears:



The axon is green, and red are the dendrites.

You can move through the model using the mouse;

Mouse movement when left mouse button pressed: rotation.

Mouse movement when right mouse button pressed: translation.

Mouse movement with ALT and left mouse button pressed : zooming in/out.

(in Linux, you can use the scroll-wheel on the mouse for zooming.)

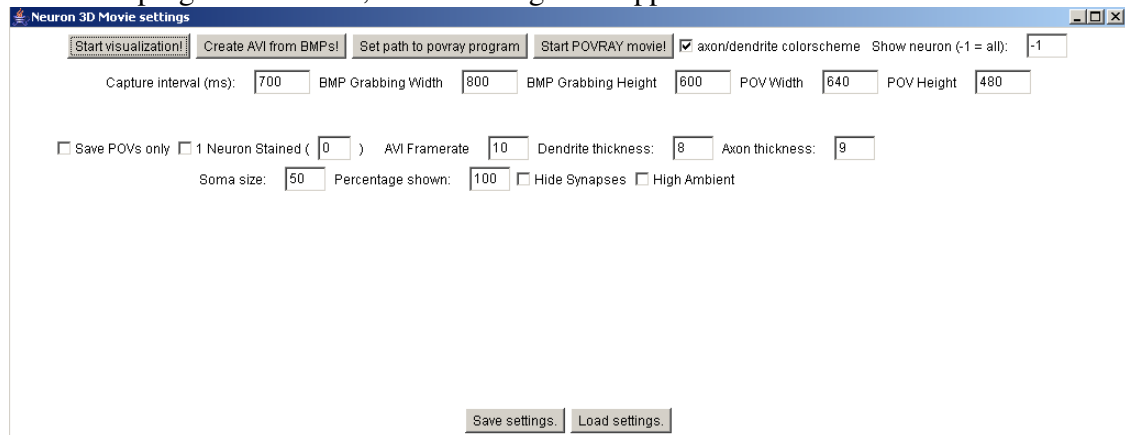
When you press "Toggle Wireframe/Full rendering" the model is fully rendered, and you can for example see the difference in neurite thickness between segments.

When you press Next neuron, the next neuron in the model is exclusively rendered, and so on.

When you want to export to POV and raytrace, remember to first press the "Save Viewpoint" button.

Neuron3D_Movie walk through:

When the program is started, the following form appears:



The screenshot shows a window titled "Neuron 3D Movie settings". It contains several buttons and input fields. At the top, there are four buttons: "Start visualization!", "Create AVI from BMPs!", "Set path to povray program", and "Start POVRAY movie!". To the right of these buttons is a checked checkbox labeled "axon/dendrite colorscheme" and a text box labeled "Show neuron (-1 = all):" with the value "-1". Below these are input fields for "Capture interval (ms):" (700), "BMP Grabbing Width:" (800), "BMP Grabbing Height:" (600), "POV Width:" (640), and "POV Height:" (480). Further down, there are checkboxes for "Save POVs only" and "1 Neuron Stained (" followed by a text box with "0" and a closing parenthesis. Next to these are "AVI Framerate:" (10), "Dendrite thickness:" (8), and "Axon thickness:" (9). At the bottom of the main area are "Soma size:" (50), "Percentage shown:" (100), and two unchecked checkboxes: "Hide Synapses" and "High Ambient". At the very bottom of the window are two buttons: "Save settings." and "Load settings."

If you haven't specified the path to the povray program (that is for example the location of the pvenhine.exe file that comes with povray) do it first.

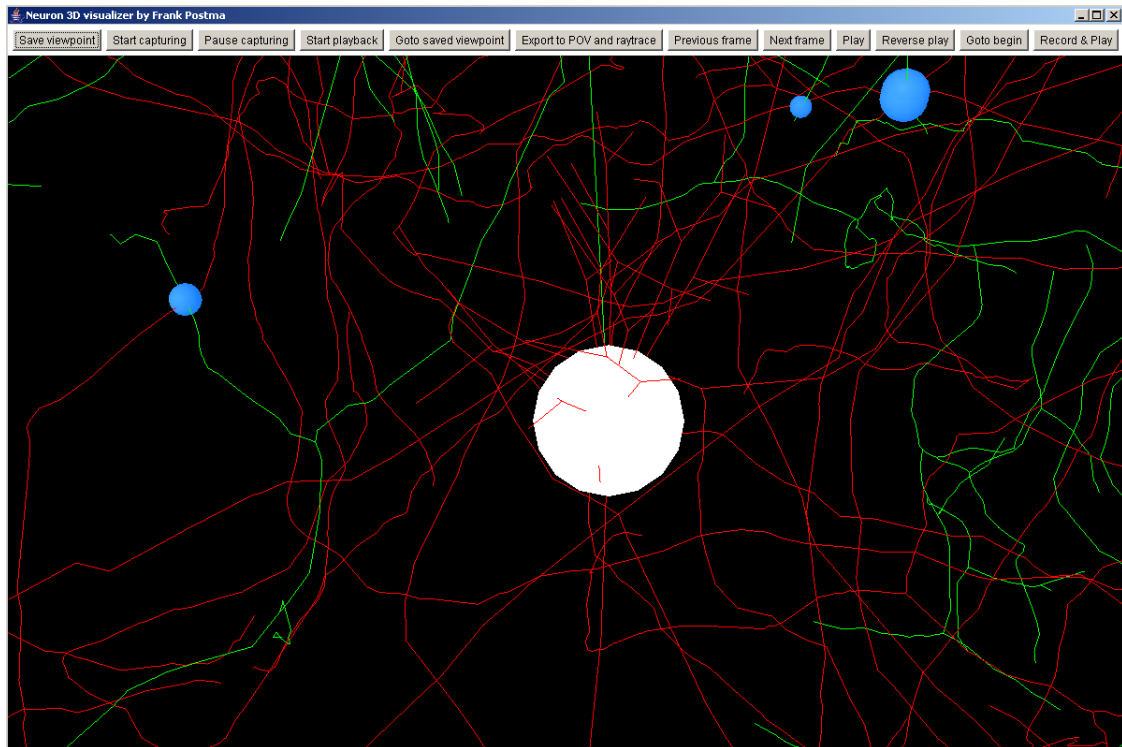
If you want to look at one neuron at a time, type 0 into the textbox next to "Show neuron".

The "Capture interval (ms)" option is used when capturing the movie. Each frame is "shot" at intervals specified by this option. So when you specify 50, the movie will be taken at 20 Hz.

You can save all your settings by clicking "Save settings". When you choose the default, these setting will be loaded next time.

Then, when you want to start viewing your model, press "Start visualization", and choose the netmorph output file(s) of your choice.

The following screen, the rendering screen, appears:



The creation of a movie of a **developing network** goes like this:

- 1) (You have chosen the files you want to include in the movie.)
- 2) Choose a good camera position and angle.
- 3) Press record & play. The button text now changes.
- 4) When the button “record & play” is back again, your movie has been captured.
- 5) Exit this screen (close it via the cross)
- 6) Press “Start povray movie”
- 7) When finished rendering all frames, choose a location to save the movie .AVI file.

The creation of a **navigation-movie** goes like this:

- 1) You have chosen the (large scale) network of your choice.
- 2) When you press “Start capturing”, your movements and navigation will be recorded until you press “Stop capturing”.
- 3) You can review your movie-recordings by pressing “Start playback”
- 4) When ready, close this window.
- 5) There is an option called “save pavs only”. When selected, the .pov frames are created without rendering them. You can render these .pov files manually yourself later with povray. And you can combine the rendered BMP’s using Neuron3D_Movie. (“Create AVI from BMP’s!” button in the main screen)
- 6) Press “start povray movie”.

Also, a combination of both techniques is possible, so capturing the navigation while playing through the development frames (using “Play” – this starts playing through the development frames)

From the render screen, you can also press “Export to POV and raytrace” like before.