

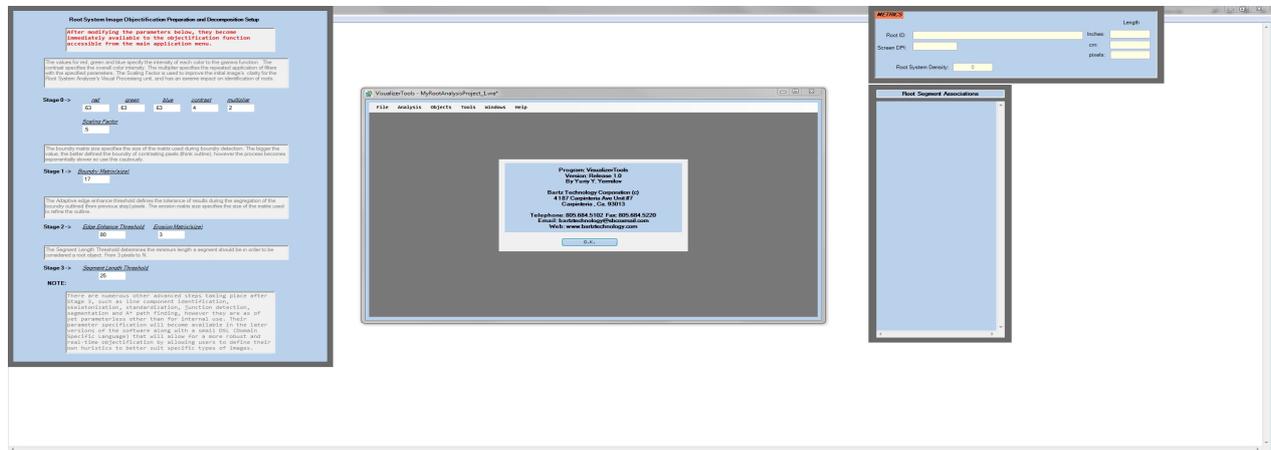
BTC Visual Root System Analyzer

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Welcome...

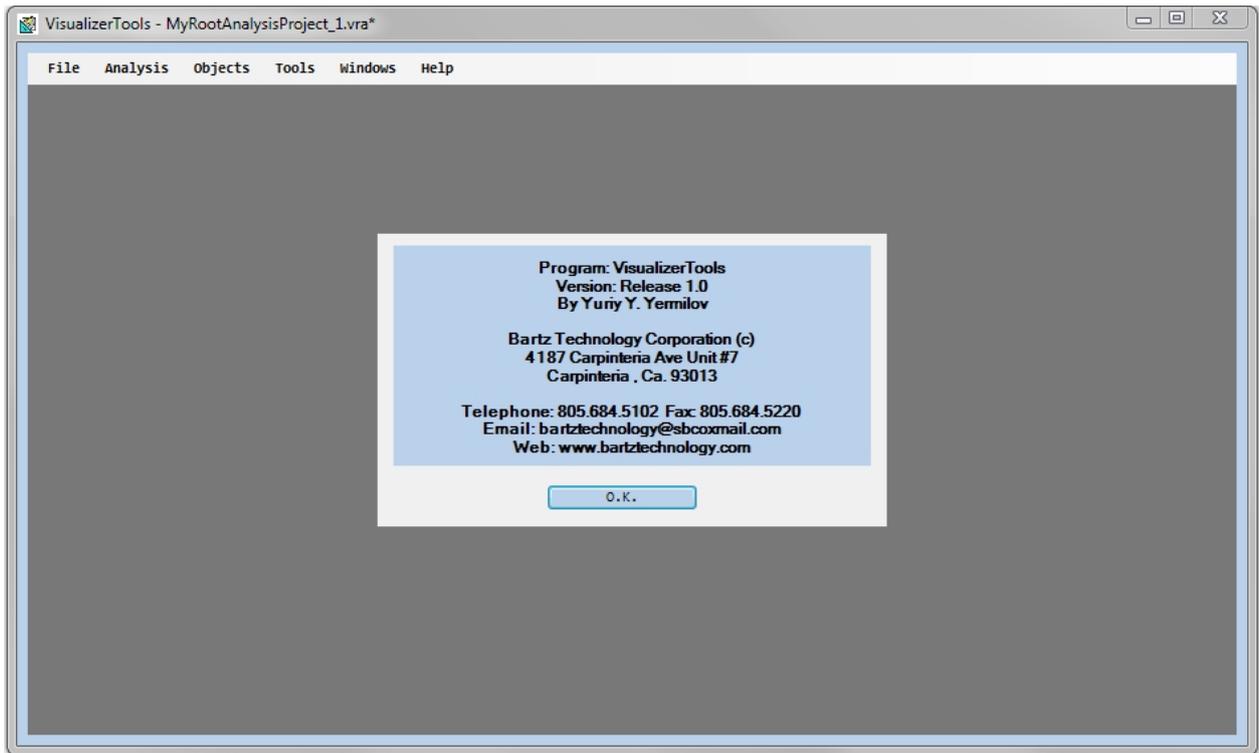
The BTC Visual Root System Analyzer is a new addition to the BTC Suite of applications. Its main use is to get an objective visual view of a root system image. Using the software allows users to create a project, load images of roots, analyze the images and have an accurate representation of the root system made up of individual objects representing roots. The software allows for a fine tinkering of parameters to cater to any type of image; this is important as a lot of images can be grainy or have a lot of distortion in the background due to sandy/complex/non-uniform type of soil.



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Welcome

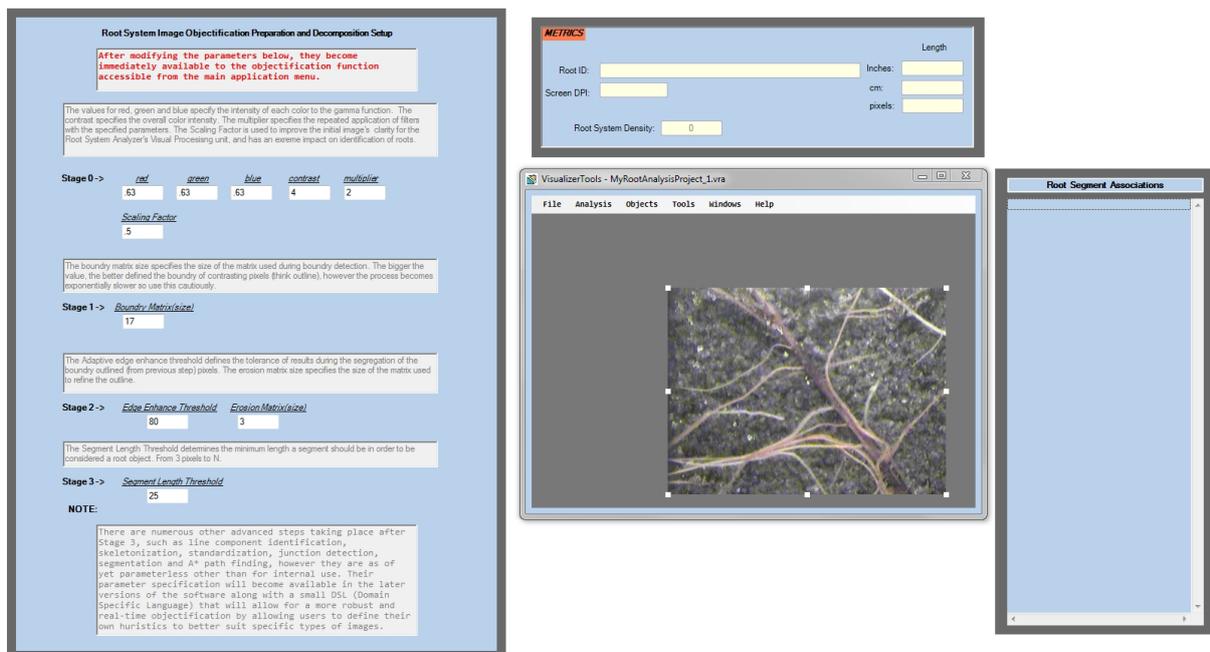
Hello, and welcome to Bartz Technology *Visual Root System Analyzer - Release 1.0*



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Getting Started

The Visual Root System Analyzer has four main windows.



From left to right, top to bottom.

The objectification parameters window allows one to change the

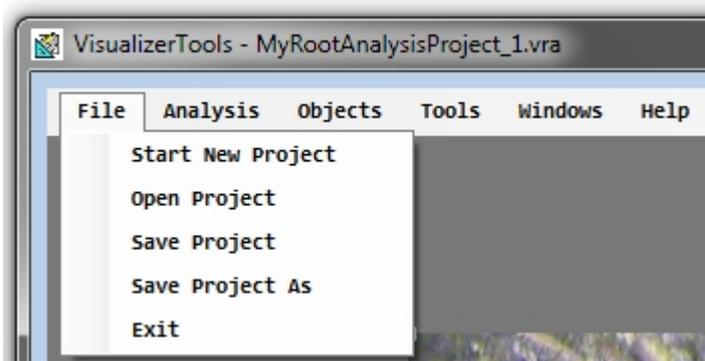
parameters used by the objectification routines.

Being able to do this allows for analysis to be done on almost any root system image as the soil varies greatly as does the camera picture settings and the final image file output (bmp, jpg, png etc)...

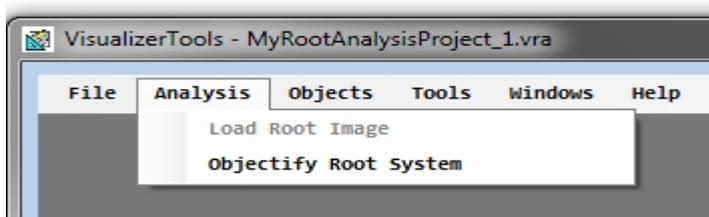
The Metrics window reports about the DPI of the current screen of the machine that the software is being run on; The length in in,cm,pixels of any one selected root object; The ID of the selected root object; and the density (amount of root objects) of the selected objectified root system.

The Main VisualizerTools window houses all of the functionality for the analysis software, and contains the following menus:

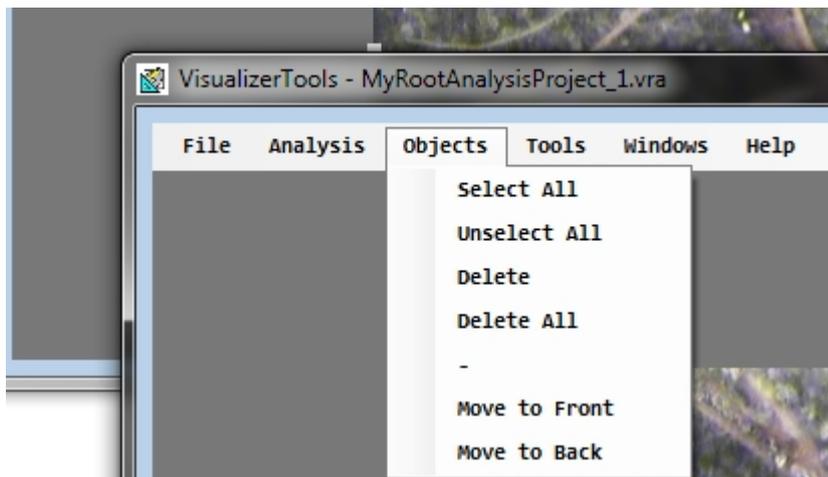
This File menu is used to create, open save and save-as your analysis projects.



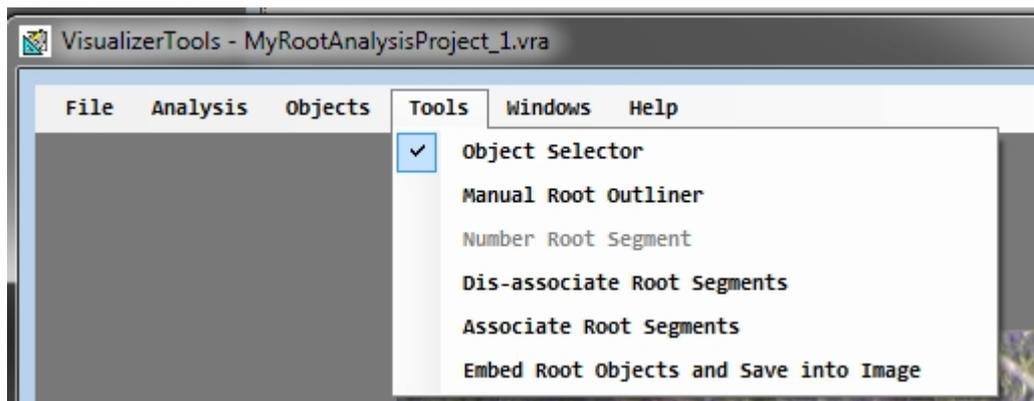
The Analysis menu is used to load more Root System Images, and Objectify the desired ones.



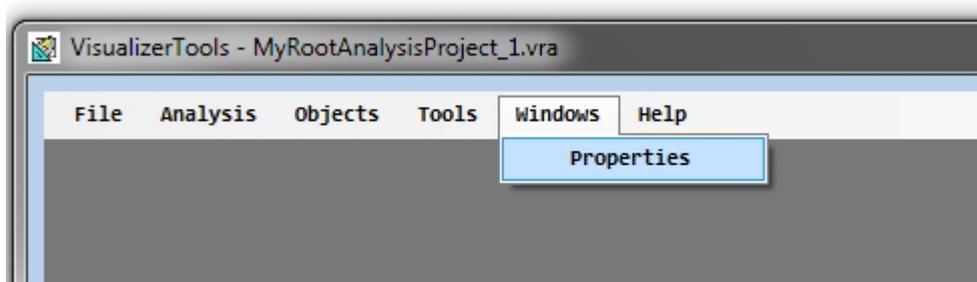
The Objects menu is used to manipulate the different selected objects in the main Visualizer Tools window.



The Tools menu is used to draw un-detected root segments and number them (which adds them to the objectified system); As well as associate selected root segments into a single segment, disassociate them and also to Embed the root system objects onto the original image and save them to a specified image file if desired.



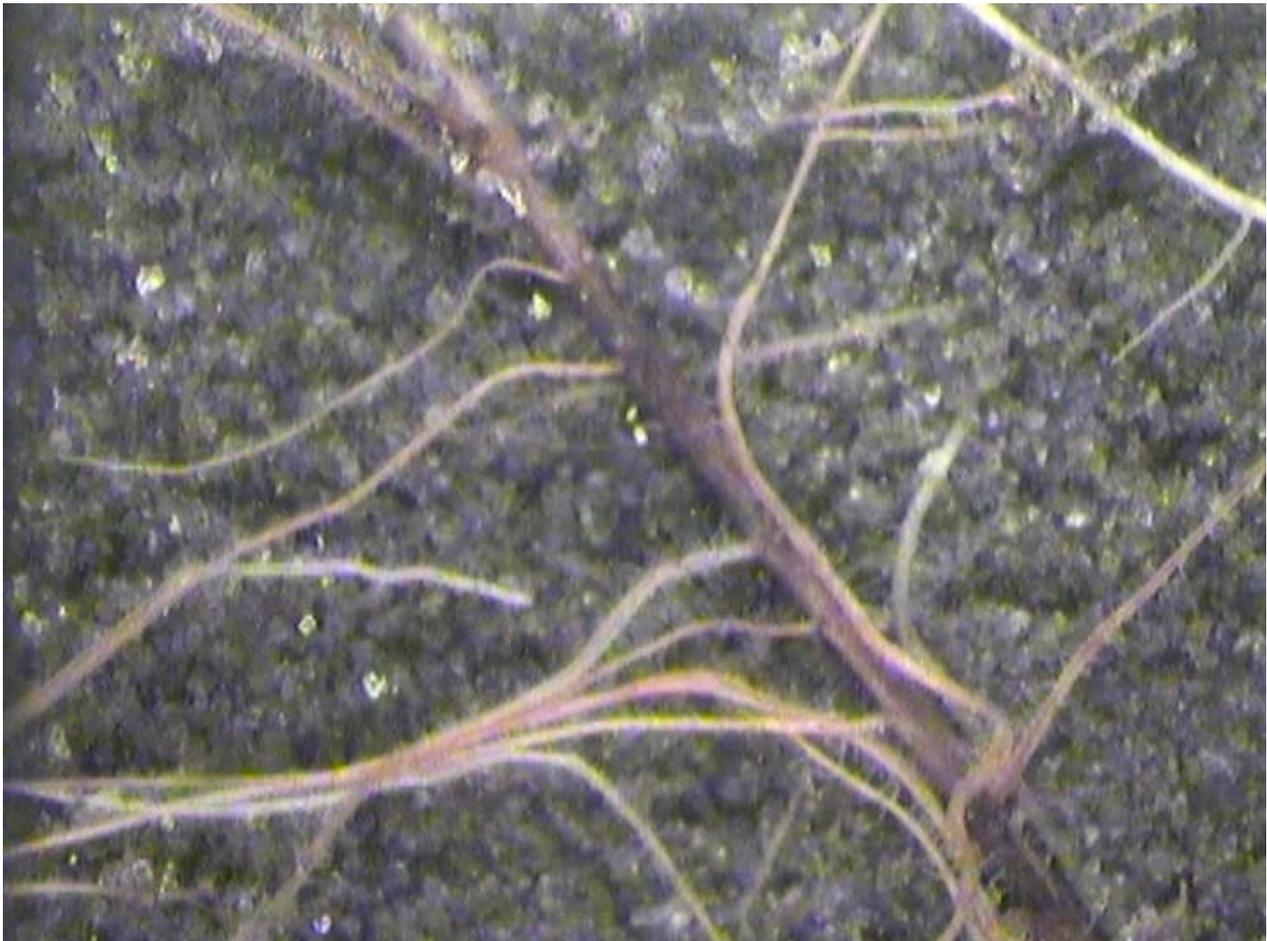
The Windows menu currently only houses the Properties.



The Properties window allows one to set objectification color (The color of the pen that draws the root objects during automatic objectification and also manual segment out-liner tool) and also the width of line segments draw by the pen.



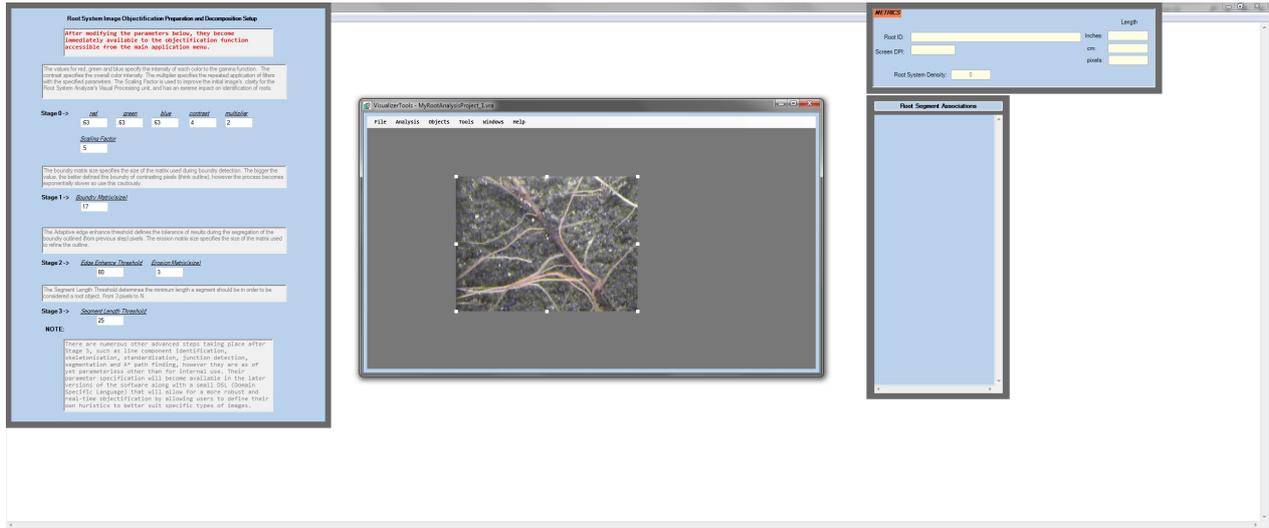
NOTE: The example image file we are going to be using, is included here. It was taken by the MiniHorizon BTC ICAP image gathering software system, and is of the Corn Root sample.



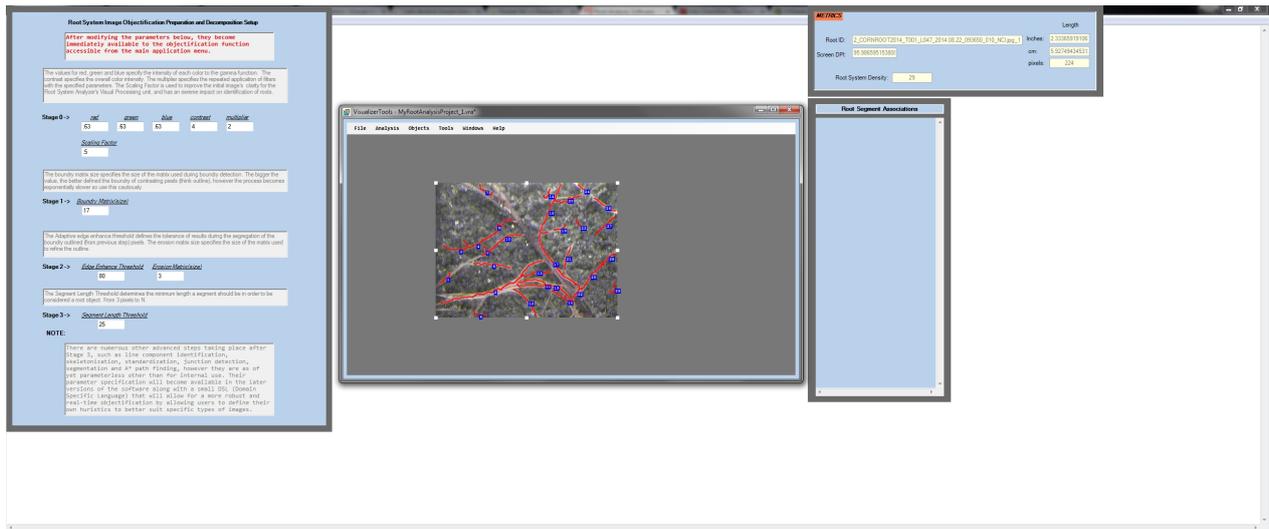
To start a new project and go through some of the software features, follow the steps below.

Click on the File menu and select Start New Project, then browse to a root system image (taken by the BTC ICAP system for example).

The screen should look something like this when the image is loaded:

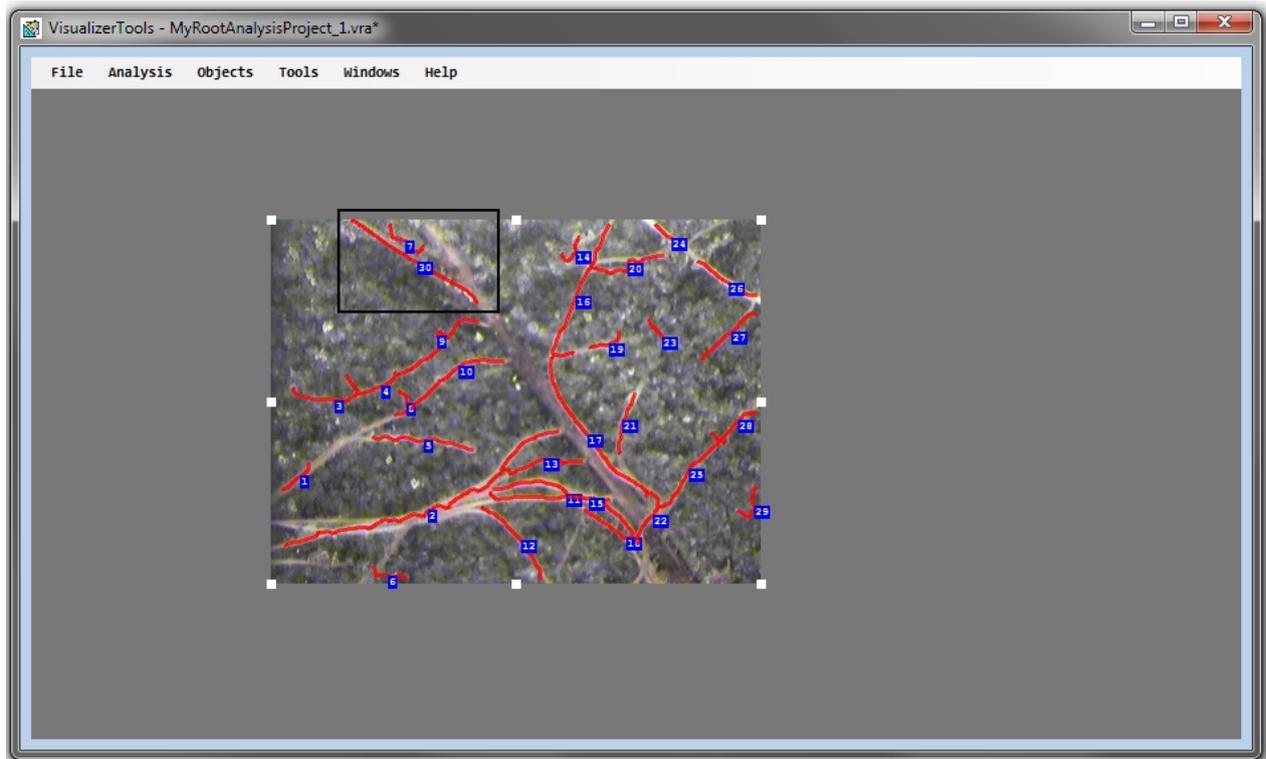


Next, click on the Analysis menu, and select Objectify Root System. This will take a few moments to complete, when everything is done, your screen should look something like this.



At this point, we can see that some of the root segments have not been outlined, and we can load another copy of the image along side the already done one, adjust the Objectification parameters and try again (an example of that will be shown later in this doc). However, we can also manually outline some of the roots by clicking on the Tools menu and selecting the Manual Root Outliner tool. Then outline the root with the mouse while holding the left mouse button. When successful, click anywhere image, then select your outlined root, click on the Tools menu and select Number Root Segment.

You should get something that looks like this:

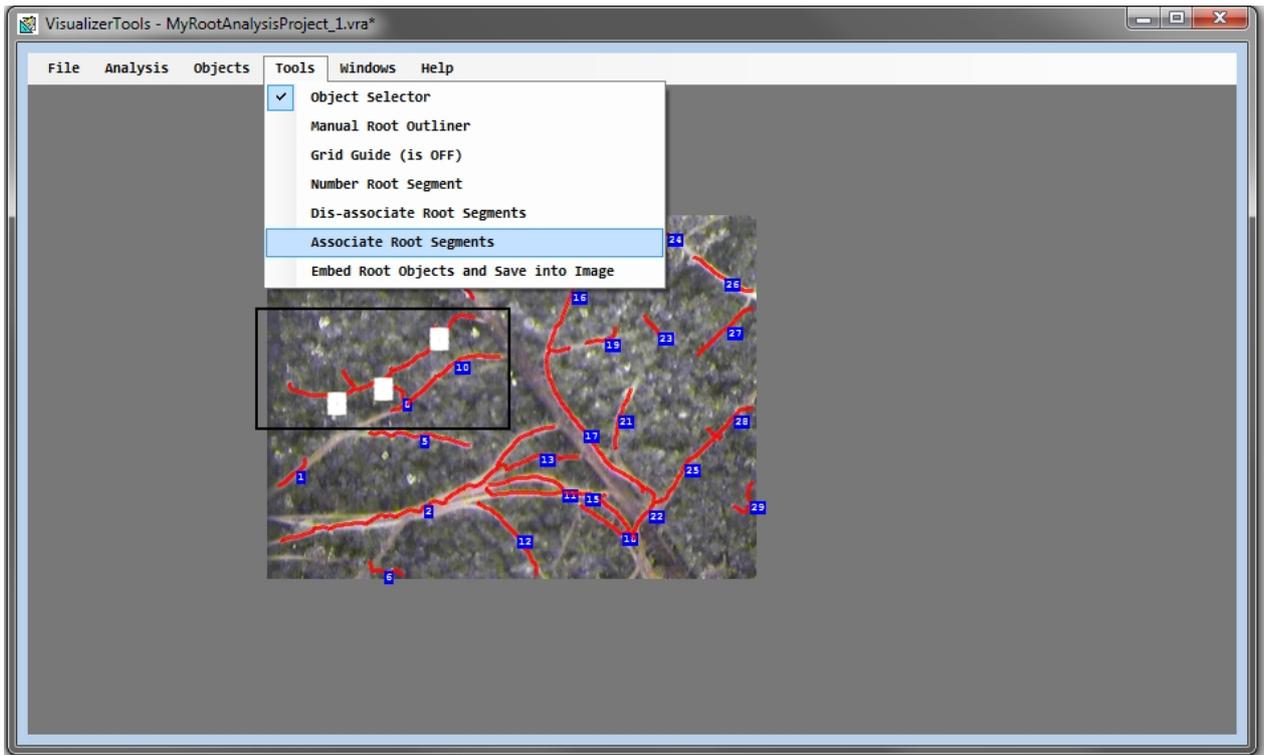


Next, we can see that root numbers 3, 4, and 5 can be considered a single segment. We can treat them as a single root by associating them.

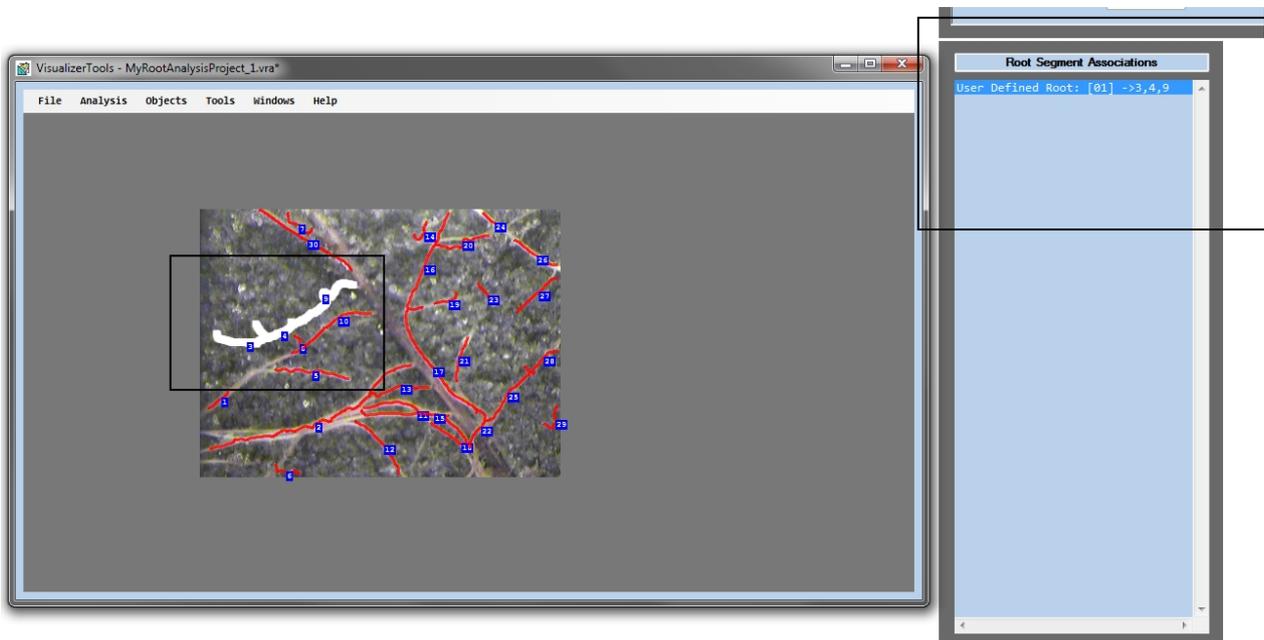
To do that, hold the left control key on the keyboard, and using the left mouse button, click on the blue boxes that have root ids 3, 4, and 5.

Now, in the Tools menu, select Associate Root Segments.

Your screen should look something like this:

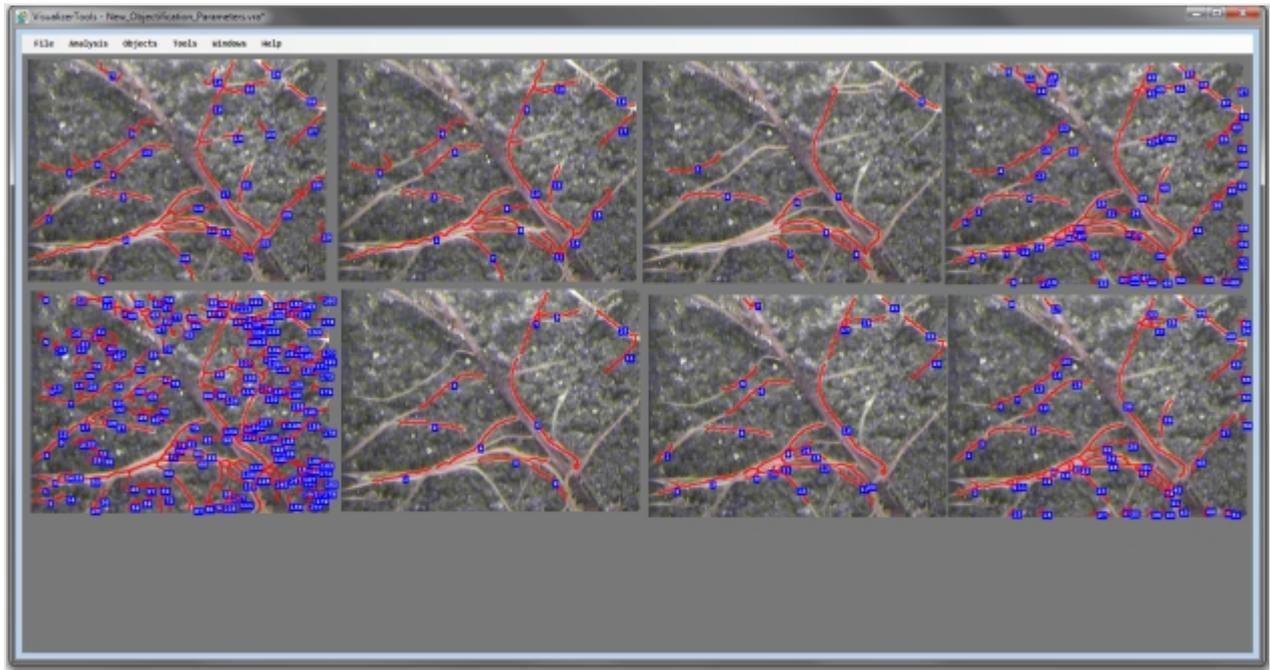


After clicking on Associate Root Segments, your Root Segment Associations window should look something like this:



At this point, save your progress by selecting "Save" or "Save As" in the File menu.

Below is an example of using different Root System Objectification Parameter settings for the same image.



This is the version 1.0 of our Release build. The massive future feature set list is included in the following section.

Thank you! :)

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System requirements

The Visual Root System Analyzer makes use of fairly advanced and intensive computational algorithms.

Recommended minimum system requirements are as follows:

- CPU: [Intel Core i5+](#)
- SYSTEM MEMORY: [8GB RAM](#)
- HARD DISK SPACE: [500MB](#)

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Getting help

For assistance, please refer to the contact information here: [Bartz Technology Contact](#)

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Future features

The current Visual Root System Analyzer has only core features implemented and the feature set will be greatly expanded, along with the usability of the software.

1. Allow for integration with BTC grid viewer lab tool projects.
2. Create stack based state mechanism to allow users to undo actions pe
3. Allow users to add notes to root segment objects.
4. Allow loading sets of images from sessions like in BTC grid viewer.
5. Add Root width measurement calculations