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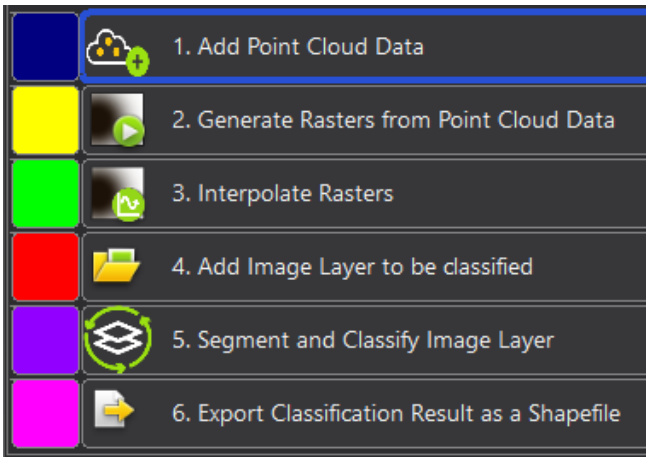
August 15th, 2023

Working with LiDAR App - User Guide

The main objective of the *Working with LiDAR App* is to classify an Image Layer's Low Vegetation, Trees, and Buildings. This is achieved by leveraging not only the spectral and contextual features of the Image Layer but also by integrating information about Height and Number of Returns from a LiDAR point cloud that covers the same geographical area as the Image Layer.

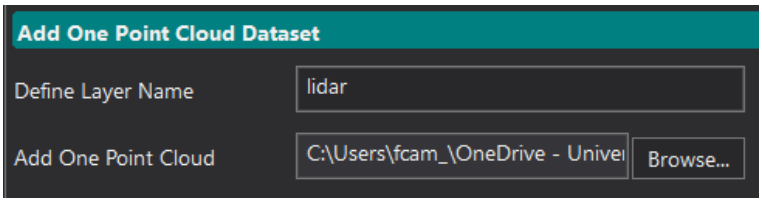
The App comprises six primary action groups, designed to be executed **in order**:



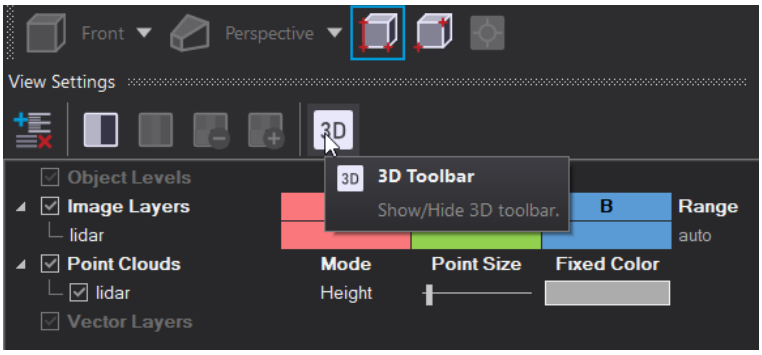
Suggested Workflow

1. Add Point Cloud Data

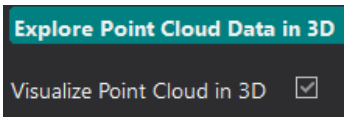
Start by defining an alias for the Point Cloud layer that will be added to the project. Then, browse for the Point Cloud dataset. **There is a sample .las file in the data folder of the sent zip file.**



Use the 3D Toolbar located in the View Settings pane to visualize the Point Cloud Layer in 3D:

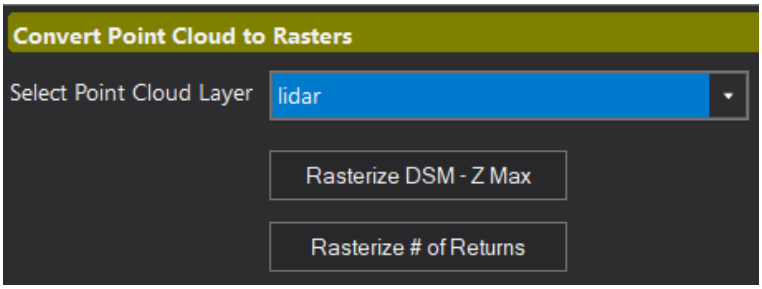


After doing it, mark the *Visualize Point Cloud in 3D* checkbox:

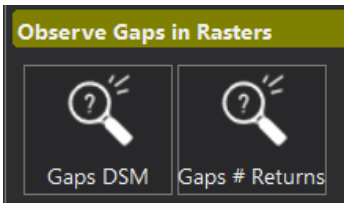


2. Generate Rasters from Point Cloud Data

Based on the Point Cloud layer, go ahead create two rasters: DSM **and** # of Returns, which will be later useful for the classification process.

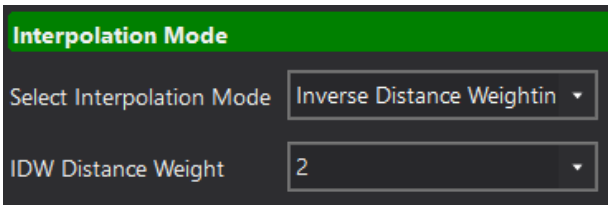


Observe that both rasters have gaps (missing data). This can be attributed to either a scarcity of points or the complete absence of points within specific regions.

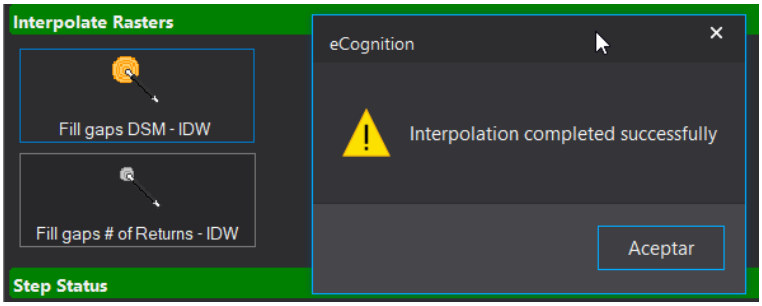


3. Interpolate Rasters

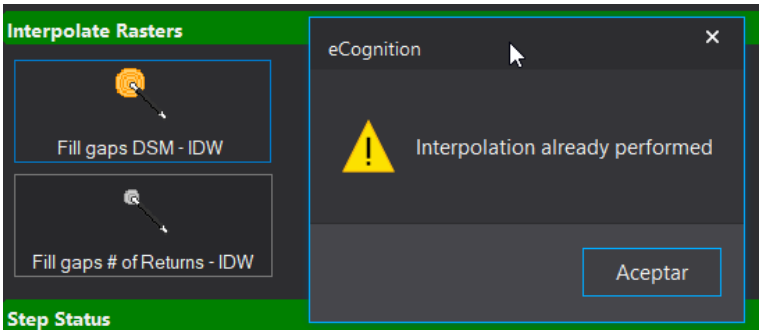
To fill the gaps, it is necessary to interpolate both rasters. To do so, select an Interpolation Mode. If the preference is for the Inverse Distance Weighting (IDW) mode, then proceed to define the specific IDW Distance Weight:



The interpolation procedure might require a few minutes to complete. A dialog box will emerge once the process has finished.

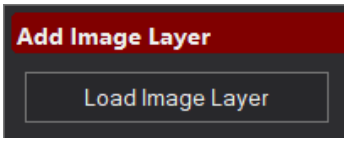


Given the time required for the operation, attempting to perform interpolation after the process has concluded will trigger a new dialog box indicating that the process has already been executed:

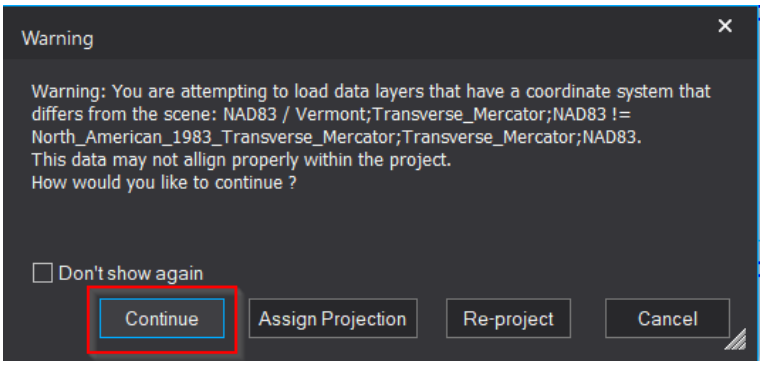


4. Add Image Layer to be classified

Now, you can add the Image Layer that will undergo the classification process. **There is a sample .tif file in the data folder of the sent zip file.**

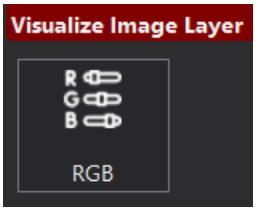


If a warning related to the Coordinate Reference System (CRS) appears, kindly proceed by clicking the "Continue" button.



To avoid any confusion, change the alias of the layer bands to one of the following lowercase options: **red, green, blue, or nir.**

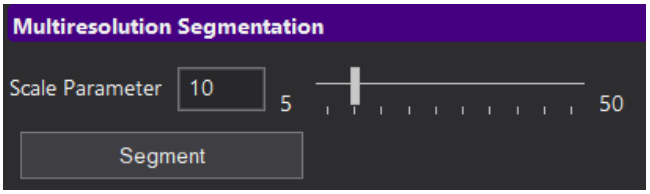
Lastly, display and explore the Image Layer in true color:



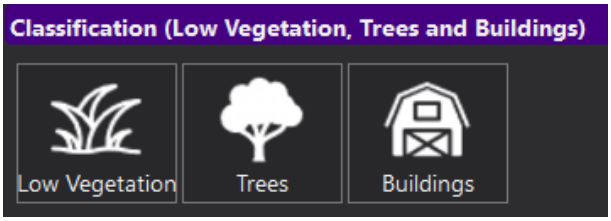
5. Segment and Classify Image Layer

As previously mentioned, the Segmentation and Classification processes do not only consider the spectral and contextual features of the Image Layer, but also the information of the DSM and # of Returns rasters.

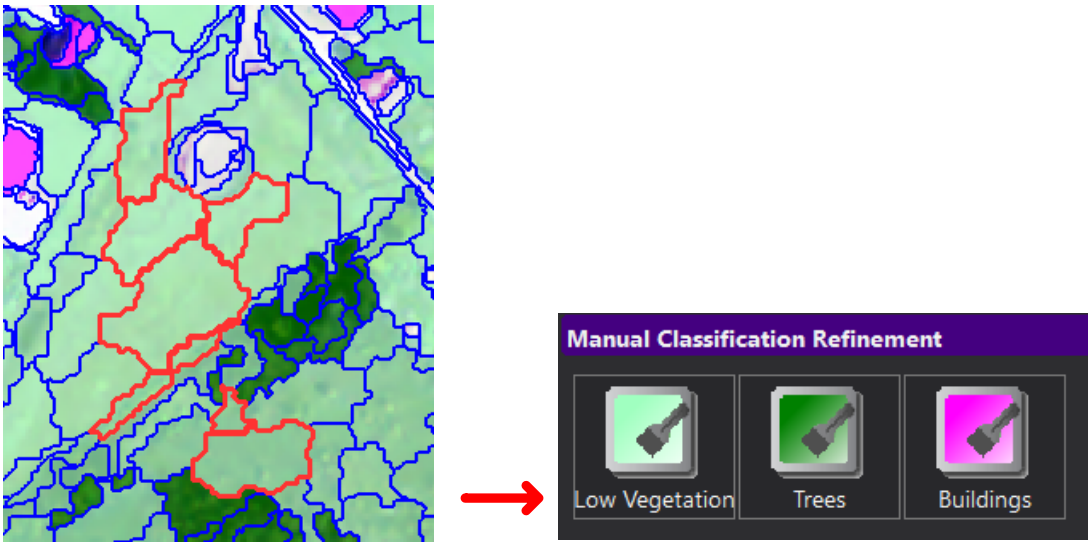
For the Multiresolution segmentation, select and scale parameter that aligns best with your requirements:



Afterwards, click on the class(es) you wish to classify:

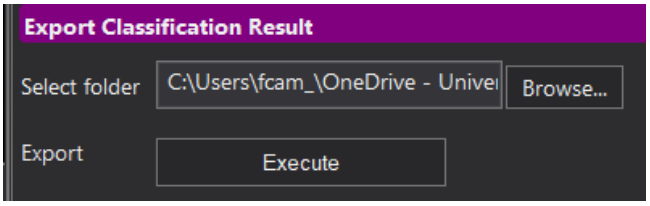


As the classification may not be perfect, you can manually refine it. To achieve so, first select the objects in the map that were wrongly classified and then click on the proper class:



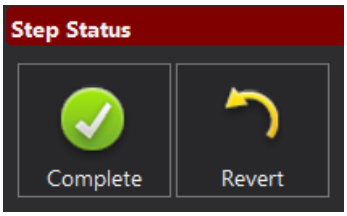
6. Export Classification Result as a Shapefile

Finally, select a folder to export the completed classification in .shp format:

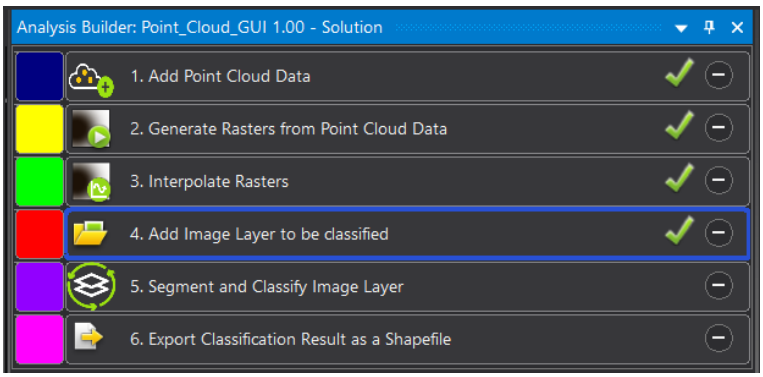


Track your progress!

At the end of each of the six main sections, you have the option to indicate its completion status by marking or unmarking it accordingly:



This is to monitor the progress done in an easier way:



Demonstration

Please review this video that displays the recommended workflow outlined earlier: https://www.youtube.com/watch?v=40WK8T_8P7M

Download the App

The App and suggested data can be downloaded in this link: https://github.com/mariarodriguezn/mariarodriguezn.github.io/raw/main/Files%20and%20Documents/IP_App.zip