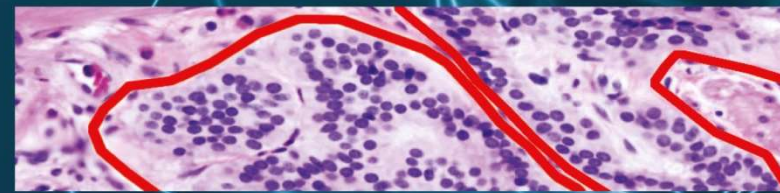




STRATAQUEST
CONTEXT ANALYSIS SOFTWARE



StrataQuest Core Quick Start

CLASSIFIER

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2. INTRODUCTION

This document is meant to help you use StrataQuest Classifier Engine tool.

In statistics, classification is the problem of identifying to which of a set of categories a new observation belongs, on the basis of a training set of data containing observations whose category membership is known.

In StrataQuest, the Classifier Engine determines to which user defined class a pixel belongs, on the basis of a training set of data containing relevant measurements for each class.

Please follow steps below.

3. STRATAQUEST STARTUP

1. Start your computer.
2. Double click on the StrataQuest icon from your desktop.
3. If you don't have a StrataQuest shortcut on the desktop, you need to start StrataQuest from the folder were it is installed (default *C:\TissueGnostics\StrataQuest*) by double clicking the StrataQuest.exe.

4. StrataQuest **Login** appears: enter your username and password, then press **I Agree & Login**.



Figure 1 – Login

4. IMPORTING IMAGES

1. Startup Screen will appear.
2. You can choose to open an already created project (1).
3. To create a new project, select the input source and then press BF button (2).

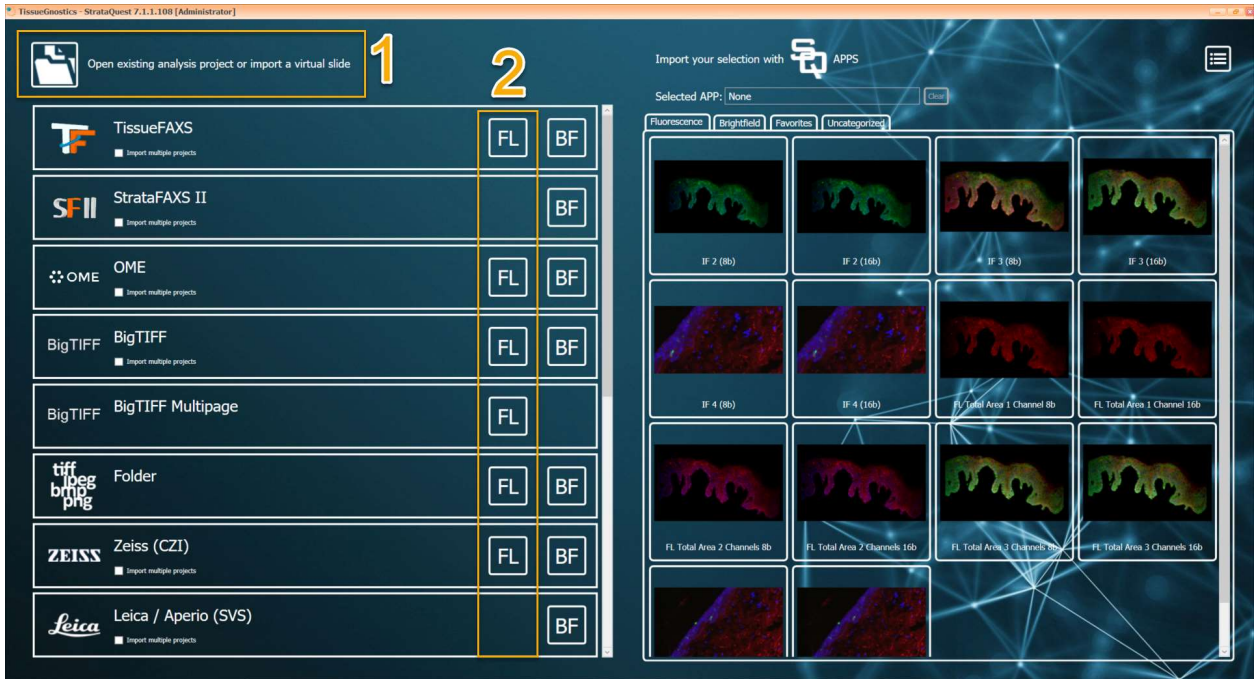


Figure 2 - Creating new project

4. Choose Images: browse on your computer for folder (1), select the images you want to use (2) and press **Next** (3).

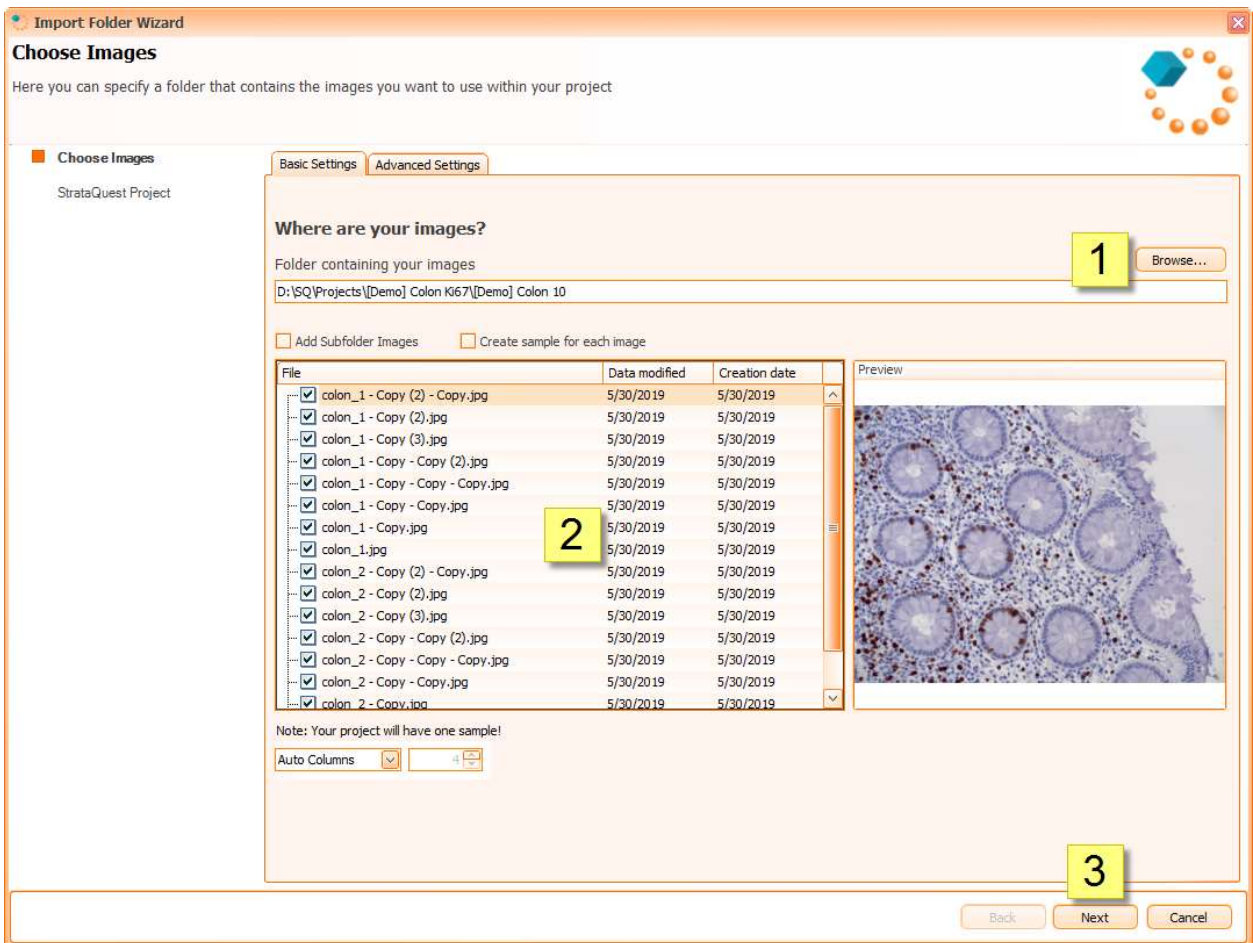


Figure 3 - Creating new project: choosing images

5. To create a new BF project using a folder, follow the next steps:
 - Select the path where the folder is stored figure, 3, tag 1). The images present in the folder will be displayed in the list (figure 3, tag 2)
 - Select the region size configuration (number of images on horizontal and vertical) (figure 3, tag 3).
 - Press Next to continue (figure 3, tag 4)
 - Basic Settings tab:
 - a. Provide a name for the project (figure 4, tag 1)
 - b. Provide a description for the project (optional) (figure 4, tag 2)
 - c. Select the storage location (figure 4, tag 3)
 - Advanced tab:
 - a. Set FOV size related values (figure 5)

- Press Finish

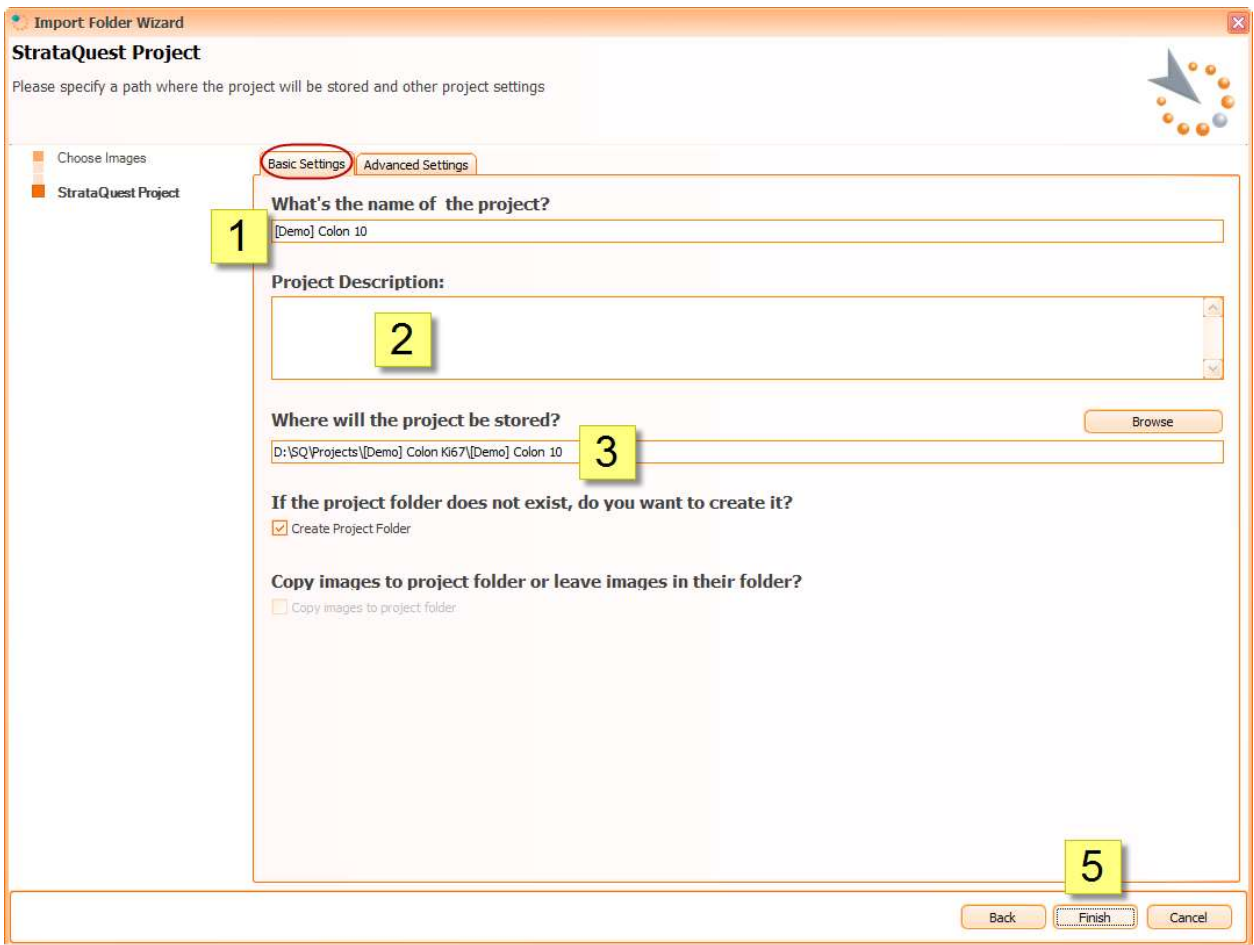


Figure 4 - Creating new project: choosing basic settings

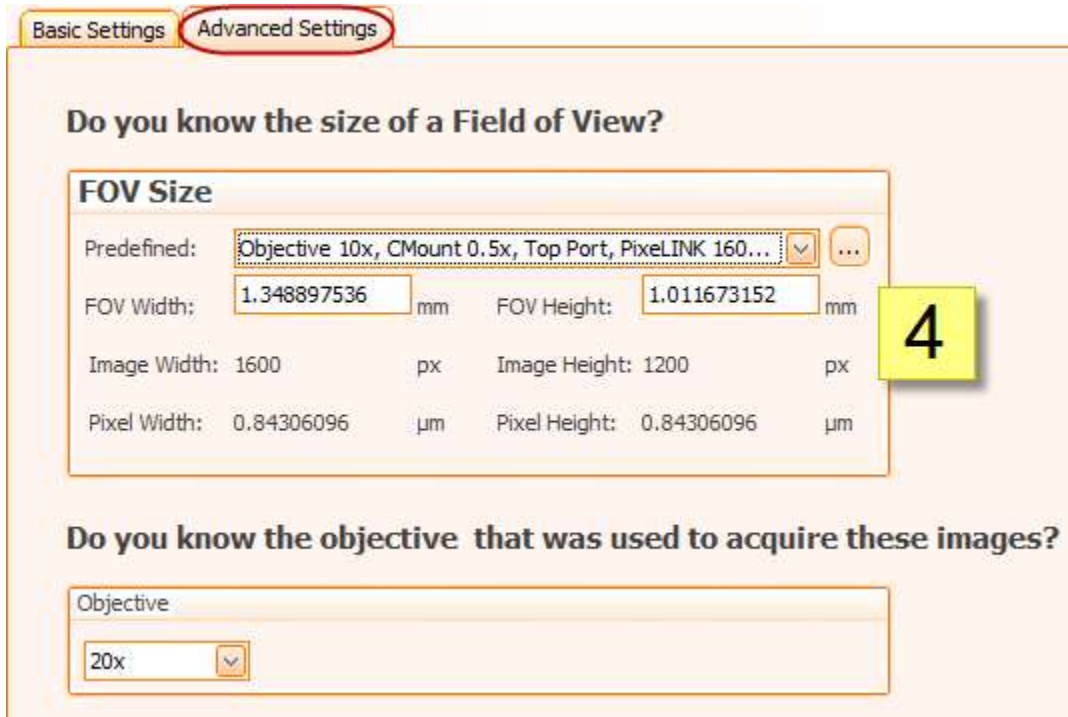


Figure 5 - Creating new project: choosing advanced settings

5. CLASSIFIER ENGINE

5.1. Configuration

To configure the Classifier Engine take the following steps:

- a. Open the Layers Editor;
- b. Add a new Layer (if none is available);
- c. From Pre-Processing section, add a new Classifier Engine (*Pre-Processing -> Operations (Advanced) -> Classifier Engine*).

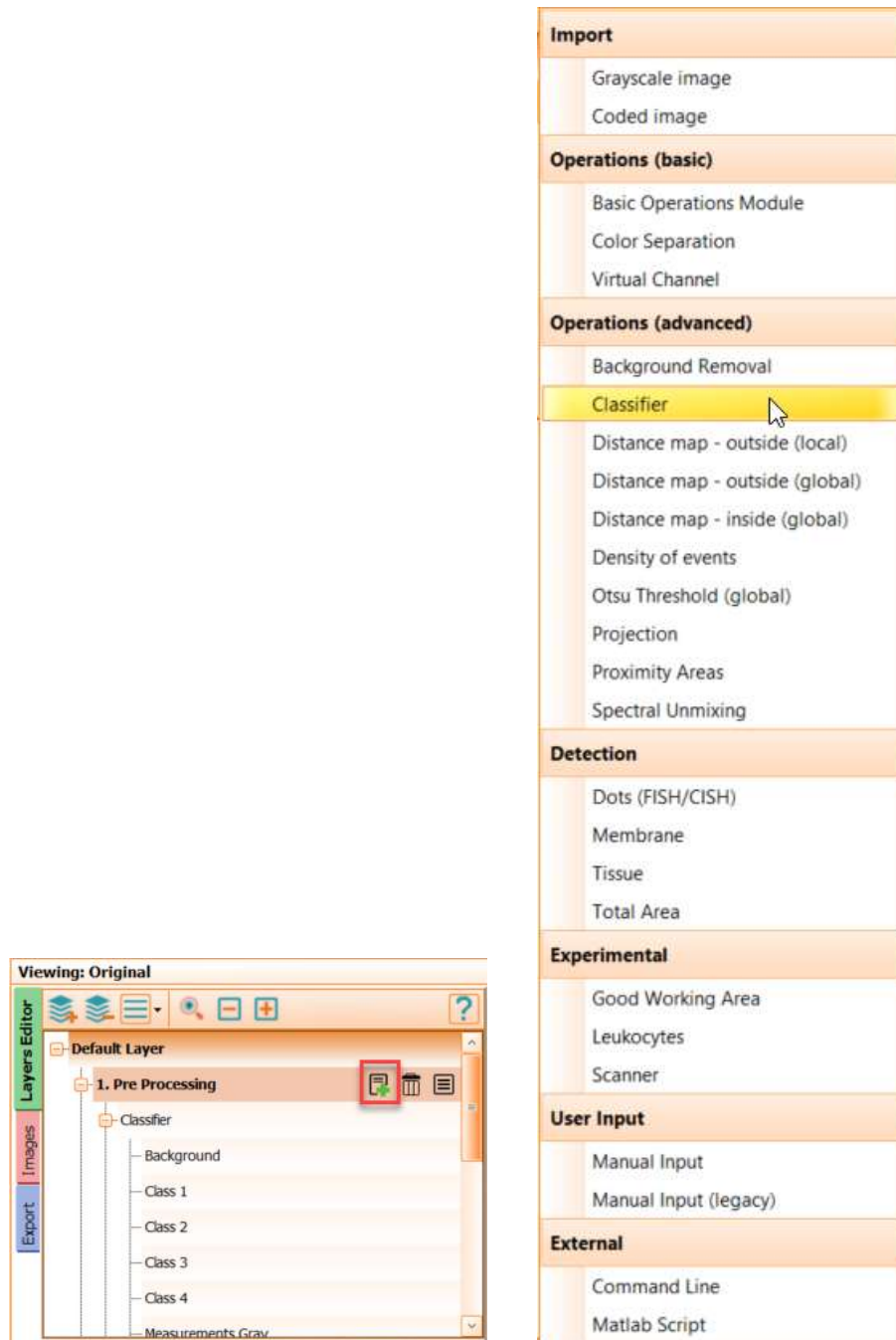


Figure 6 - Accessing Classifier Engine

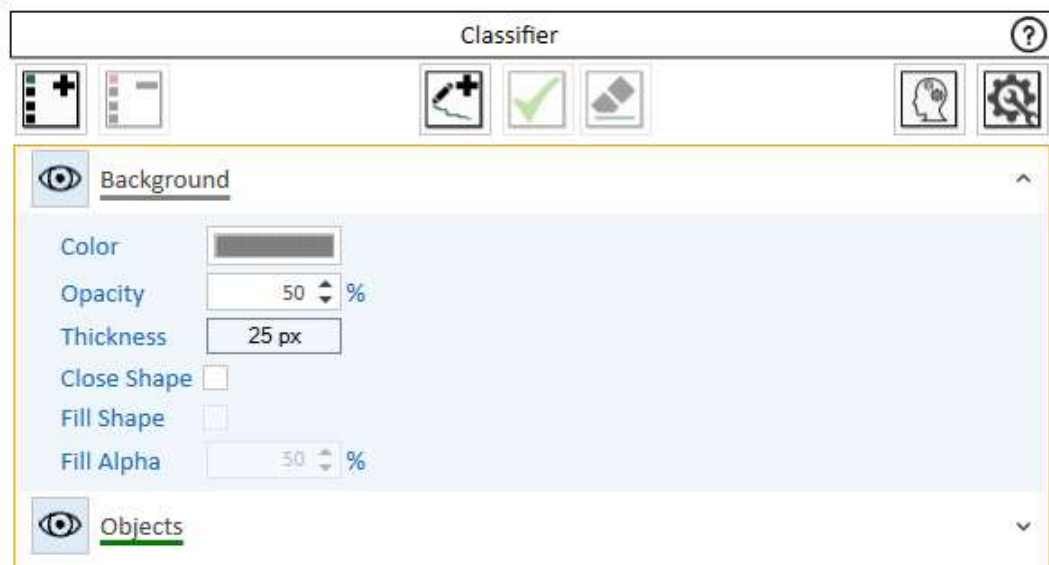



Figure 7 - Classifier Engine

- d. Now you have to define the types of classes you want to add by drawing demo areas, so the application “learns” how to recognize the areas it is supposed to search.

5.2. Defining Classes

- To define a class, press **Add new class button** ().
- For the new class, select color, opacity, thickness of the drawing line. If you want, you can choose to automatically close the drawing shape, fill the shape or fill transparency.

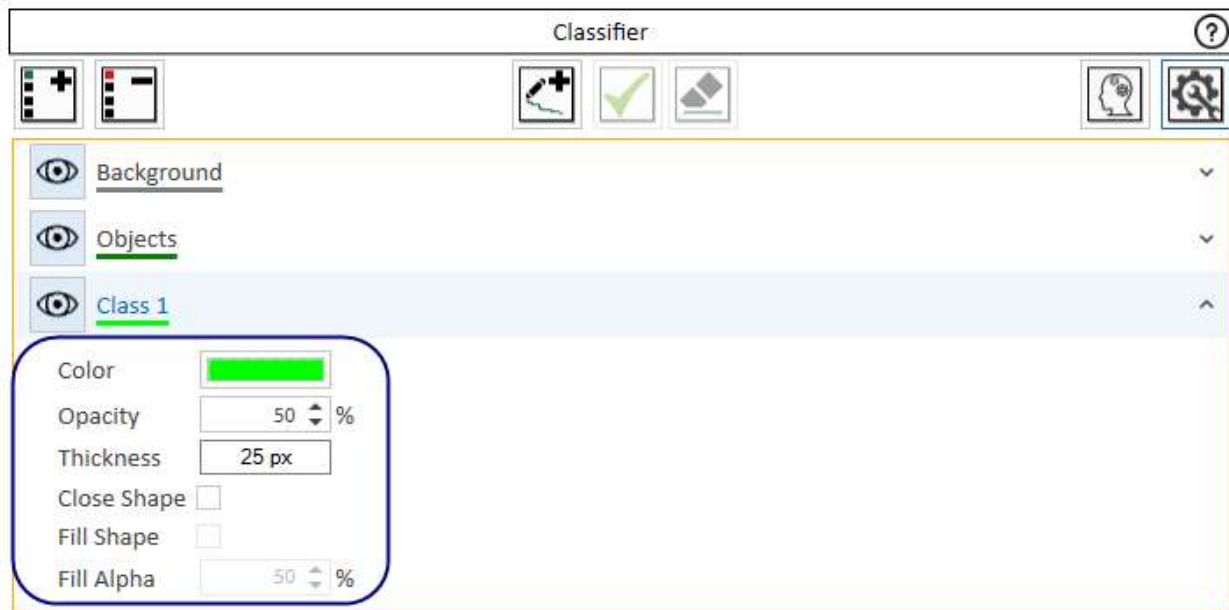






Figure 8 - Defining classes

- Select one class from the list.
- Press **Start Drawing** () and begin to draw on the sample.
- Click **Apply** () in order to save the drawn shape.
- If needed, you can erase what you have drawn, remove all drawn objects by pressing **Start Erasing** ()
- To delete a selected class press **Remove selected class** ()

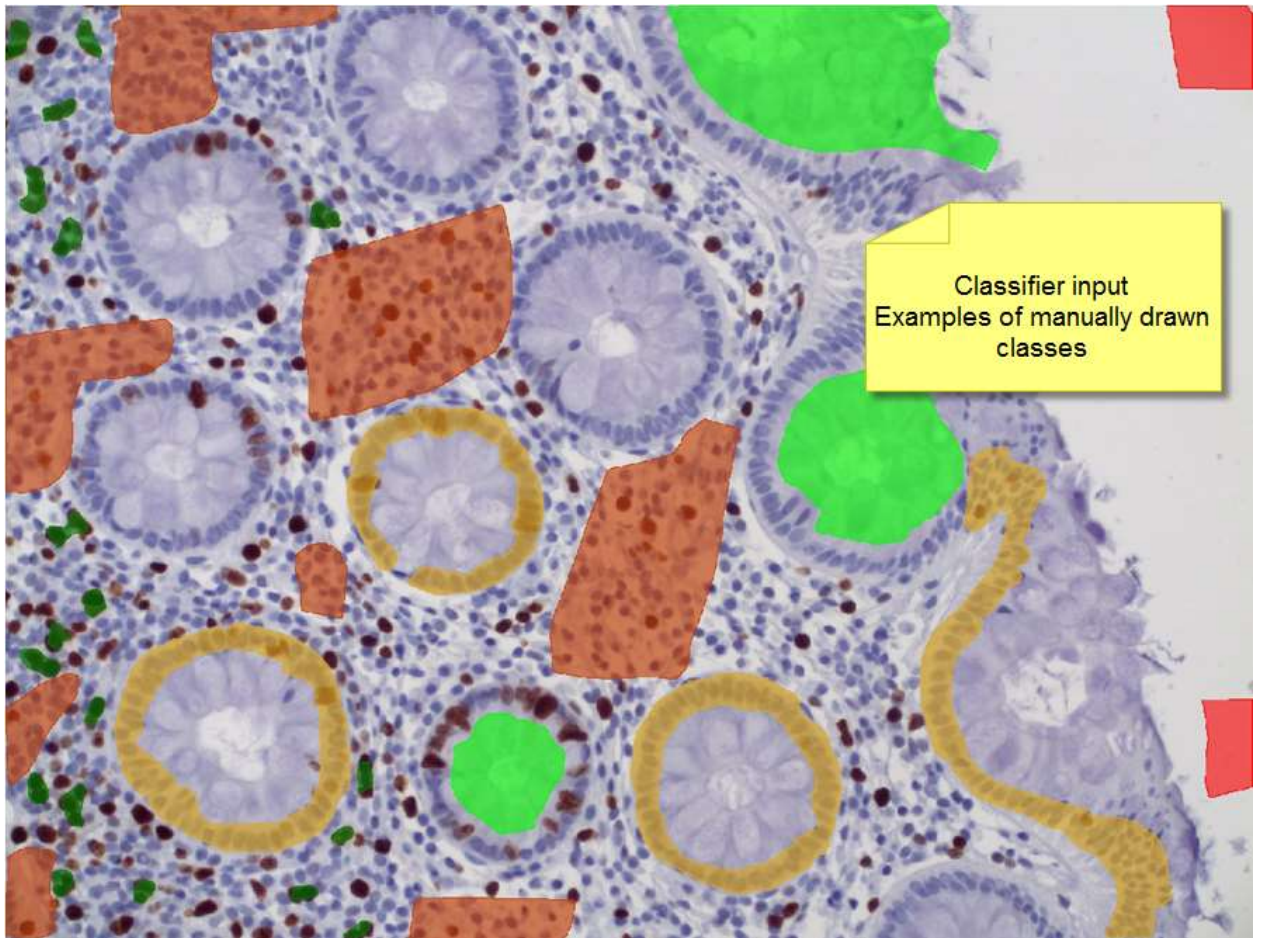


Figure 9 - Manually drawn classes used as training input

5.3. Settings

Press **Advanced** () to access more Classifier Settings.

Input

- Choose Original as image type (Original is also the default choice) Select the input image(s) for the Classifier Engine. Because StrataQuest allows the combination of different engines, some analysis cases might require preliminary steps before classification (e.g. noise reduction, color conversion, filtering, etc.). In these cases, the output(s) from other engine(s) is to be used by the Classifier Engine instead of the Original Images.

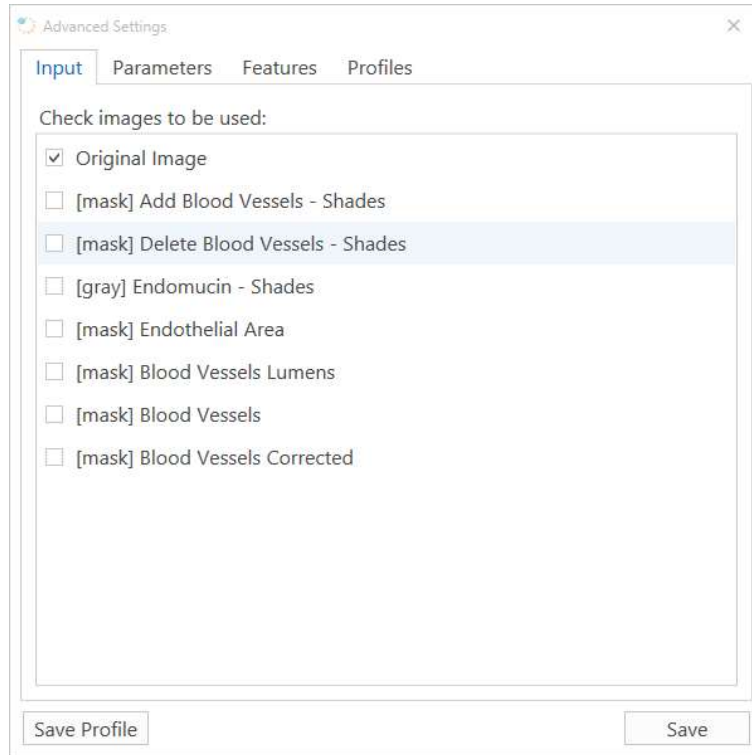


Figure 10 – Input info

Parameters

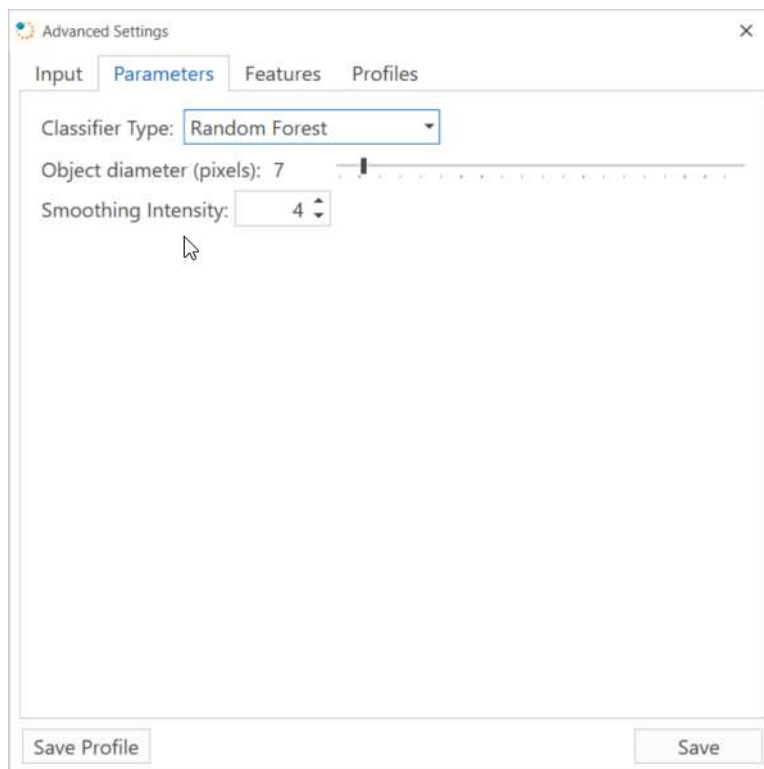


Figure 11 - Parameters

- Choose **Classifier Type**: The default classifier is Random Forrest but the user can select another available classifier from the list available.
- Choose **Object diameter**: Set the tile area (width x height). A tile (an observation) is the image area to be assigned to a user-defined class based on computed selected-measurements.
- **Smoothing intensity**: gives a smooth and uniform aspect to the image.

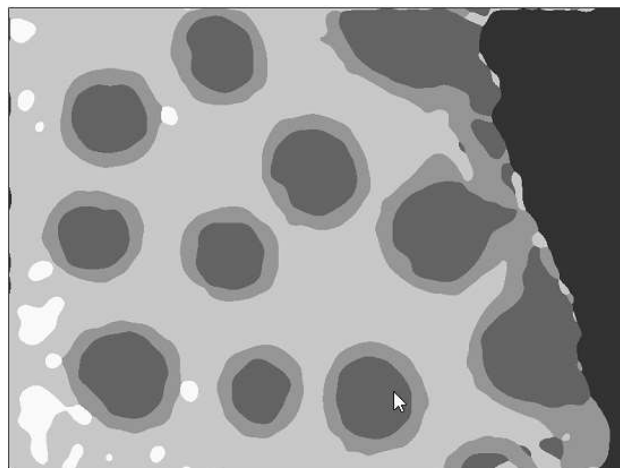
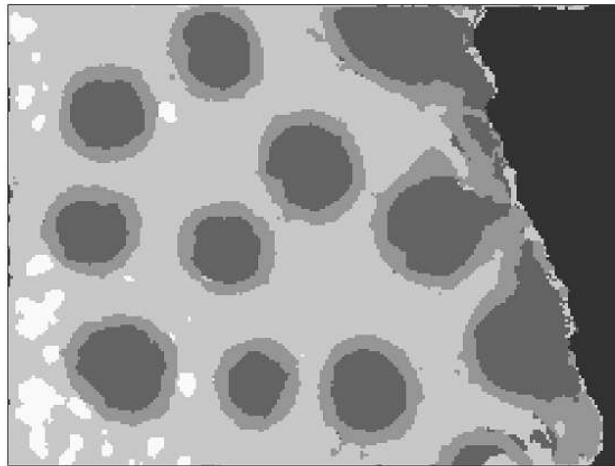


Figure 12 – Smoothing intensity: value “0” and value “4”

Features

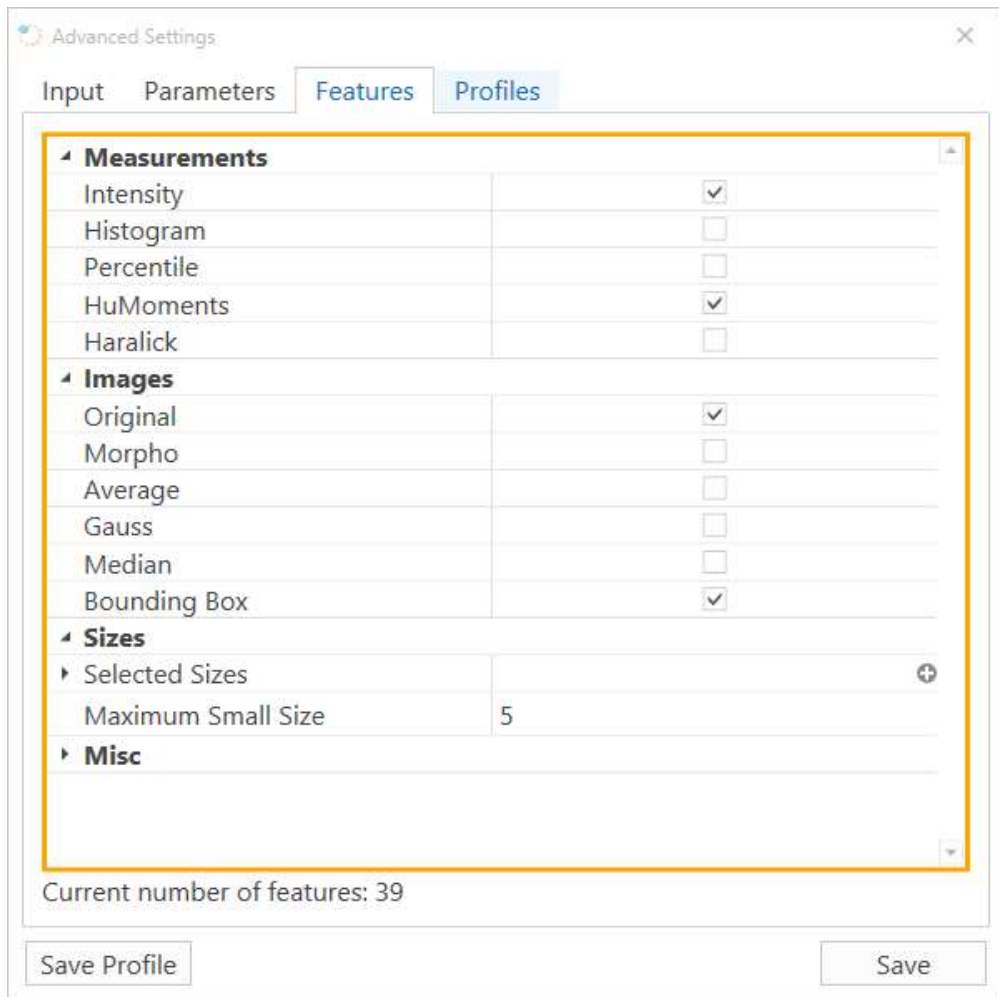


Figure 13 - Features

- **Measurements:** measurements to be computed for each tile;
- **Images:** Virtual channels generated for each tile used to compute the selected measurements;
- **Sizes:** Define proximity areas used to compute the selected measurements. Statistical measurements are gathered by “looking” around the tiles at different distances;
- **Misc:** Option to identify the relevant measurements in the training phase. Only the relevant measurements will be used in the analysis, thus reducing the computation time.

Profiles

A profile represents a predefined configuration / a sum of predefined settings for the Classifier Engine.

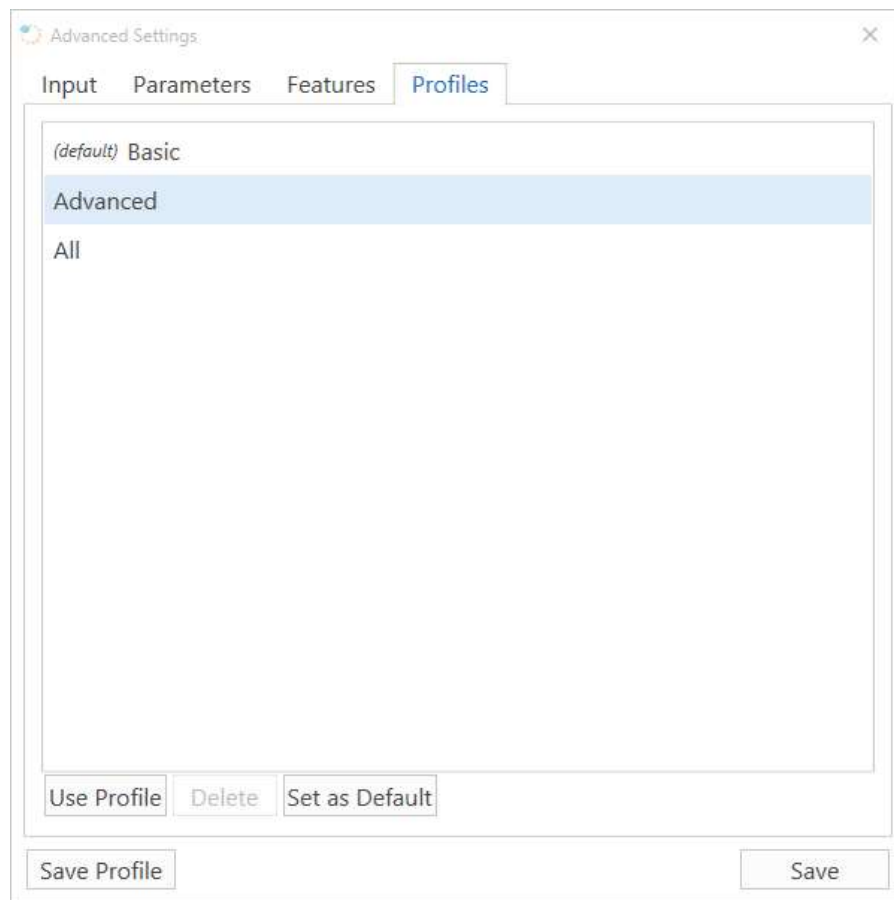




Figure 14 - Profiles

- To use selected profile, press **Use Profile**.
- To delete selected profile, press **Delete**.
- To choose a profile as default, press **Set as Default**.
- **Save Profile**

5.4. Training and analysis

After finishing all the settings mentioned above, press **Start**

Training () , then **Analyze** () .

- To generate the output images, go to **Classifier Engine - >Add Images for Each Output**.
- Classifier engine brings in all the outputs: masks for each class, gray map, coded map.

- Gray map can be used for measurements – such as on what class a nuclei is on.
- Note that normal mask can also be used for measurements. (potentially that masks can be used for detection and measurements).
- Coded map can be used to for visualization

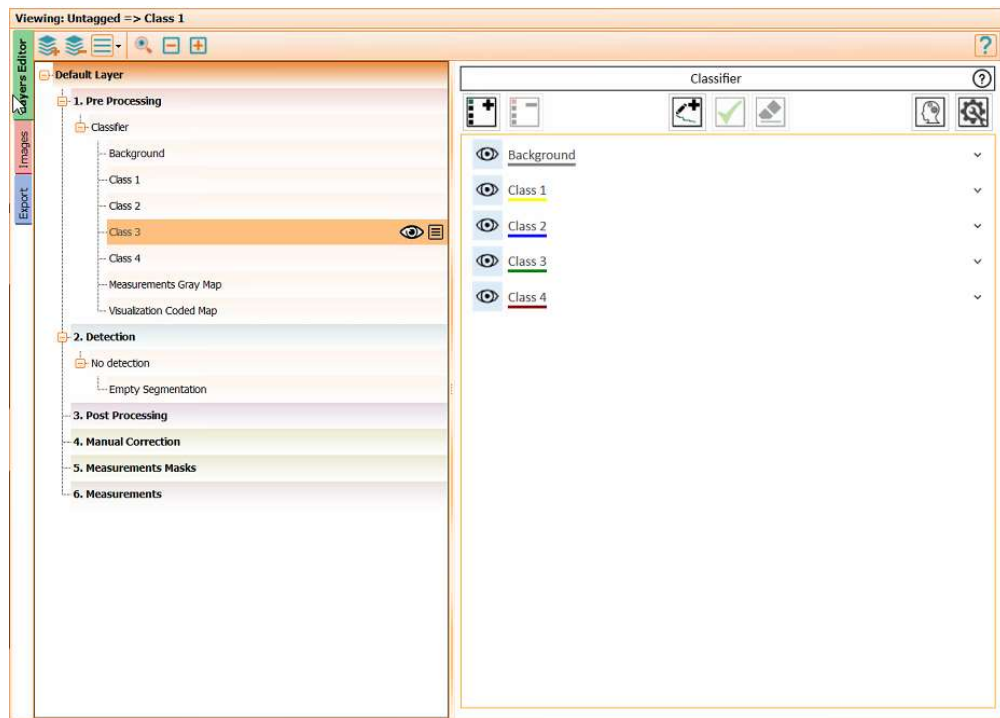


Figure 15 – Classifier engine

- The output images will be generated.
- Then, if needed, you have to manually intervene to adjust the results. This means reviewing the settings described above and change the parameters to generate better results.

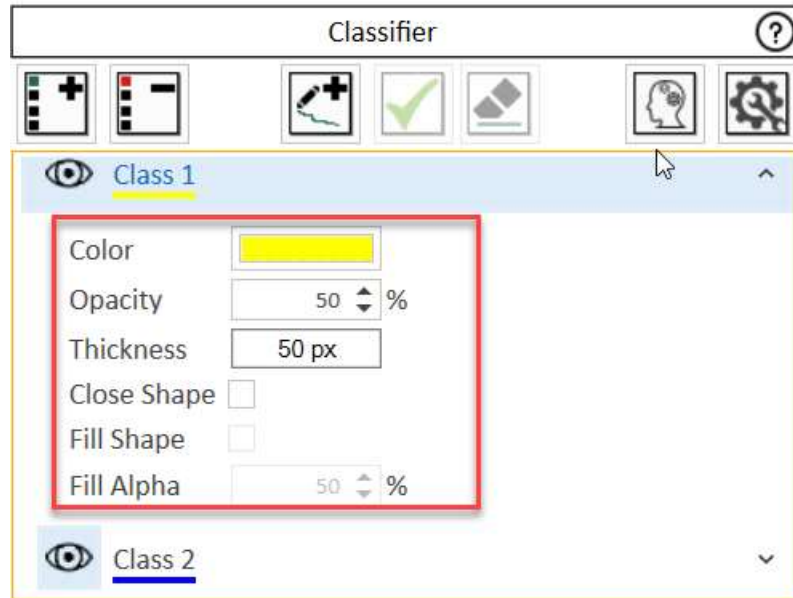


Figure 16 – Settings to be manually reviewed

Automation

It is possible to get measurements for a particular class using Quick Actions feature (starting V7.1). This type of automation will save you time, allowing to obtain data within a few clicks.

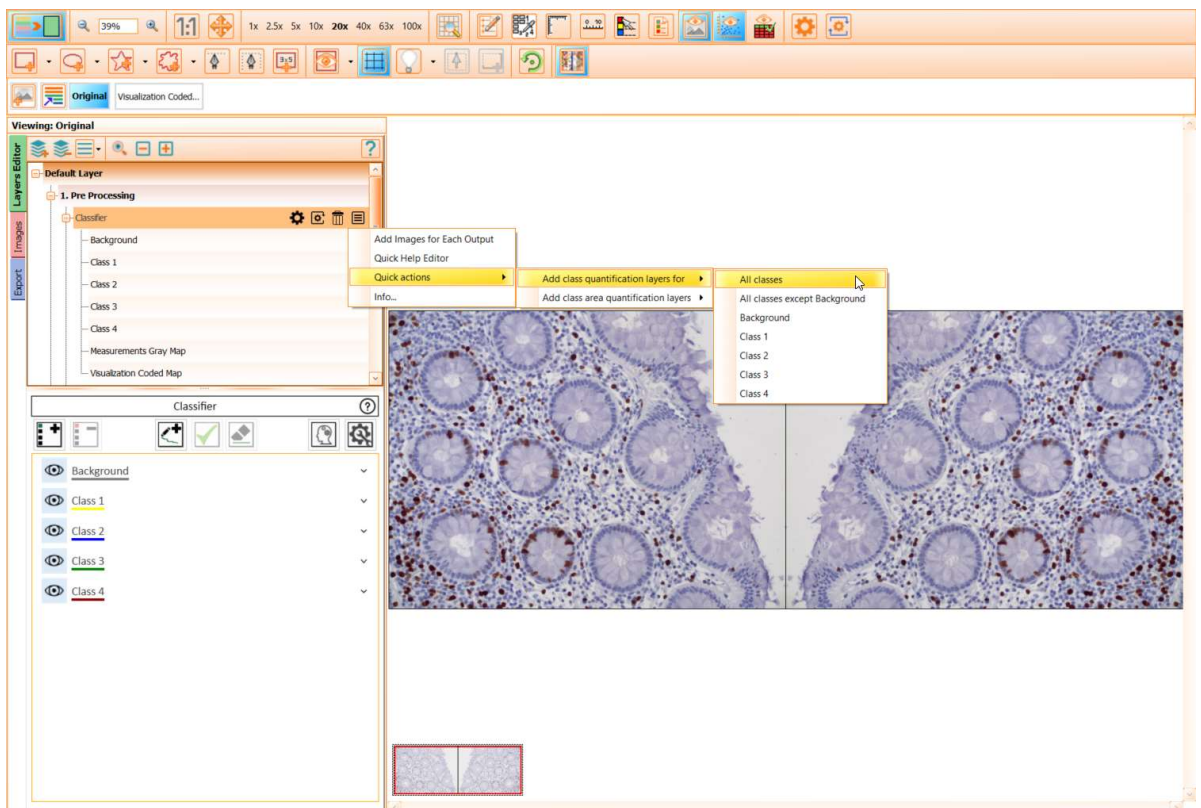


Figure 17 – Using Quick actions

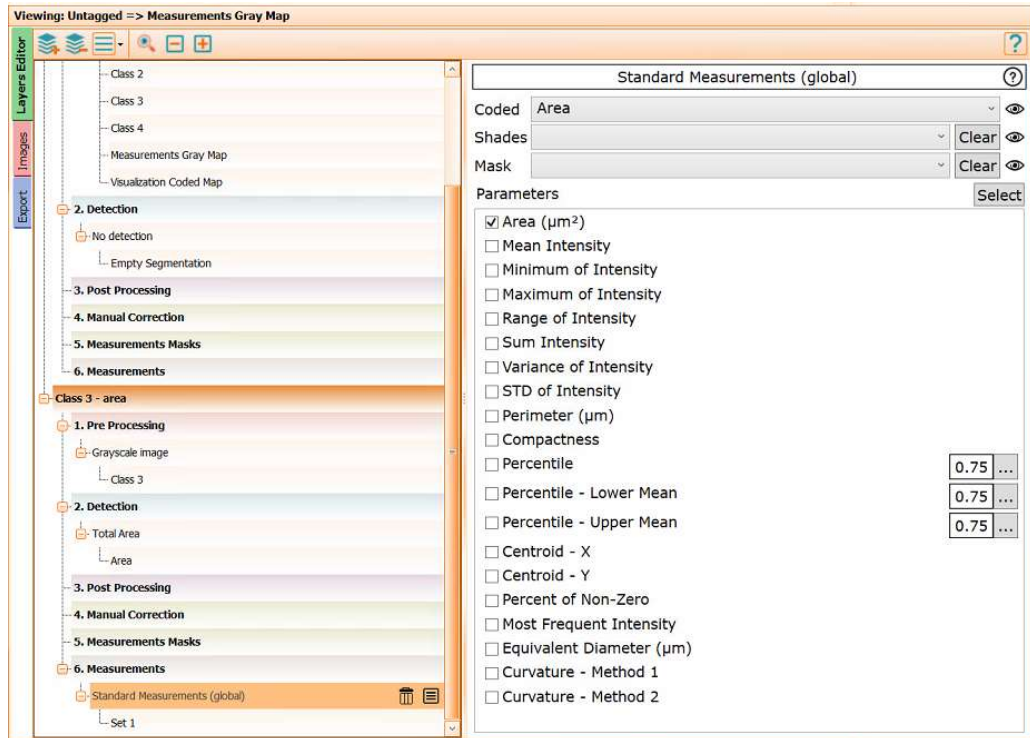


Figure 18 – Example of measurements data obtained via Quick actions

Below, you can visualize the output image:

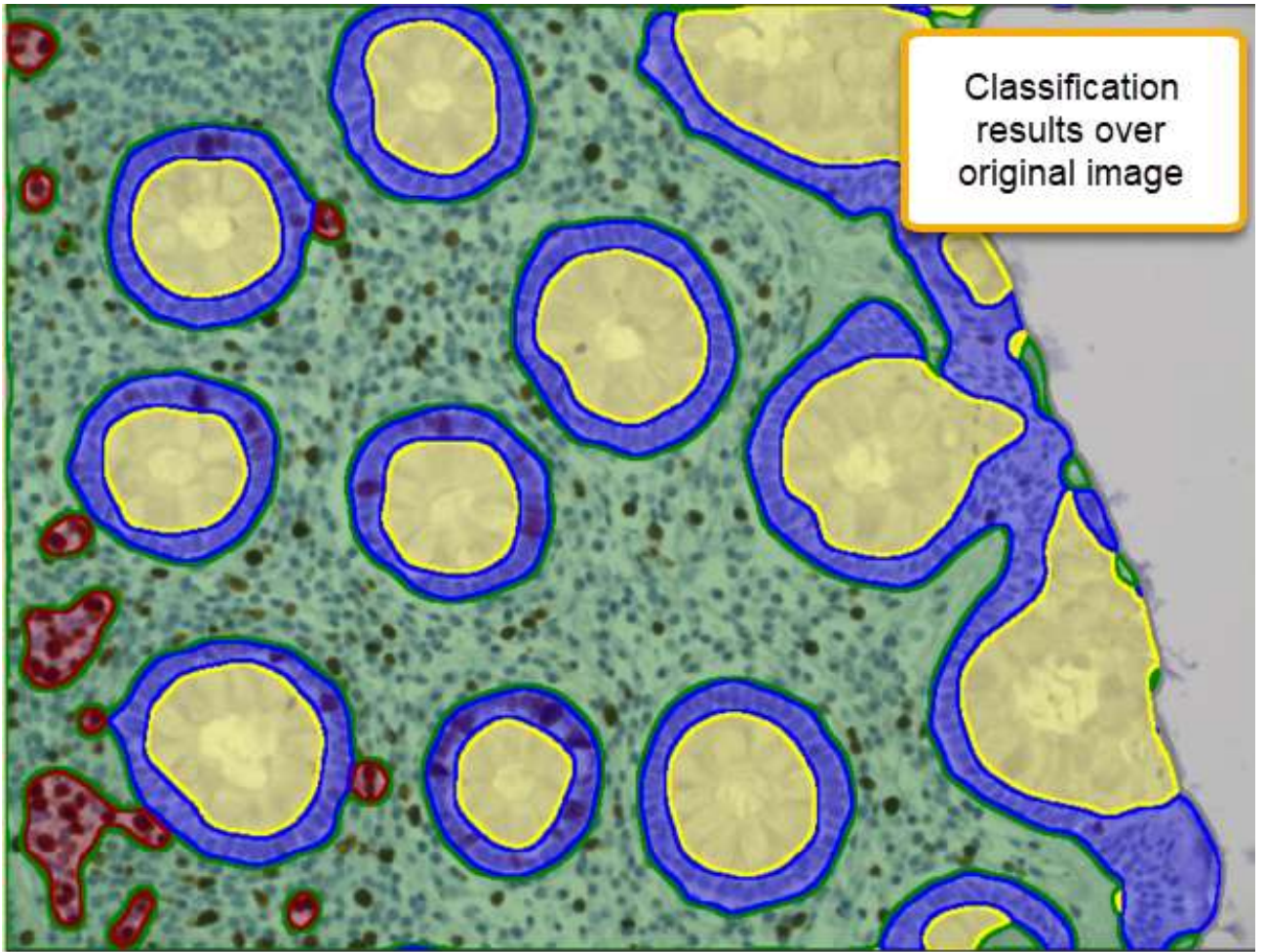


Figure 19 - Classification Results

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