

WimRetina

Analysis results in detail

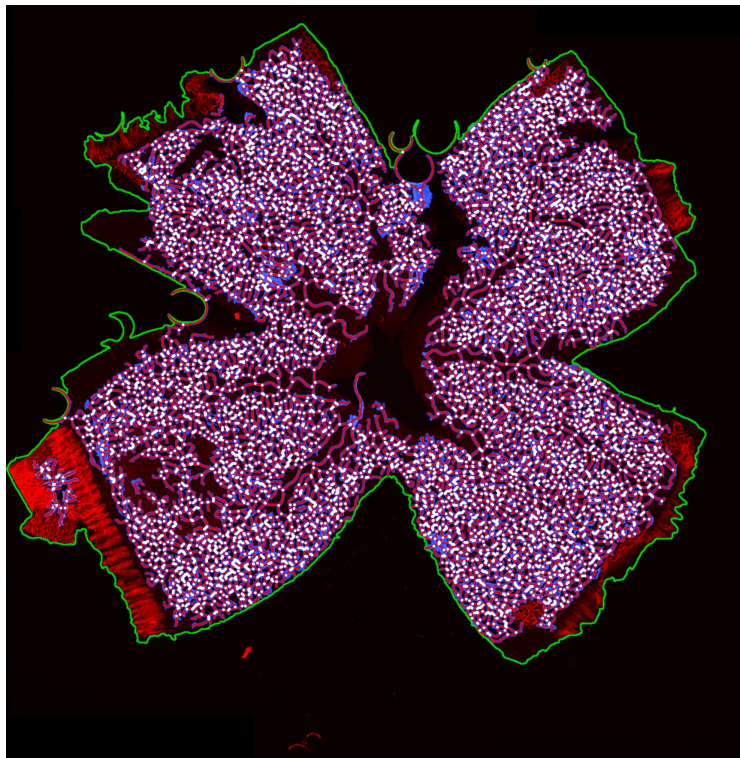
For every set of images that you upload to WimRetina, you will receive the following data files, bundled inside a zip file:

- A Results Control Image for each uploaded image, consisting of your original images with an overlay of the detected vessels in it.
- CSV format Results Data Sheet with the vessels-related measured data for each image.
- An extra CSV format Results Data Summary of the whole order.

Let's check them in detail.

1. Results Control Image

Every input image will produce a control image to assess the accuracy of the analysis output. It consists of the input image with the vessels tree structure and the other angiogenesis parameters outlined on it, as shown in the image below:



Sample result image where the ROI (green), vessels covered area (blue), vessels skeleton (red) and branching points (white) are marked.

This image will have the name of your input image followed by “_Exp01” and will be saved in “jpg” format.

2. Results Data Sheet

Every input image will also generate an output CSV file (comma separated value format, similar to an Excel sheet) with the following measurements:

Global Metrics:

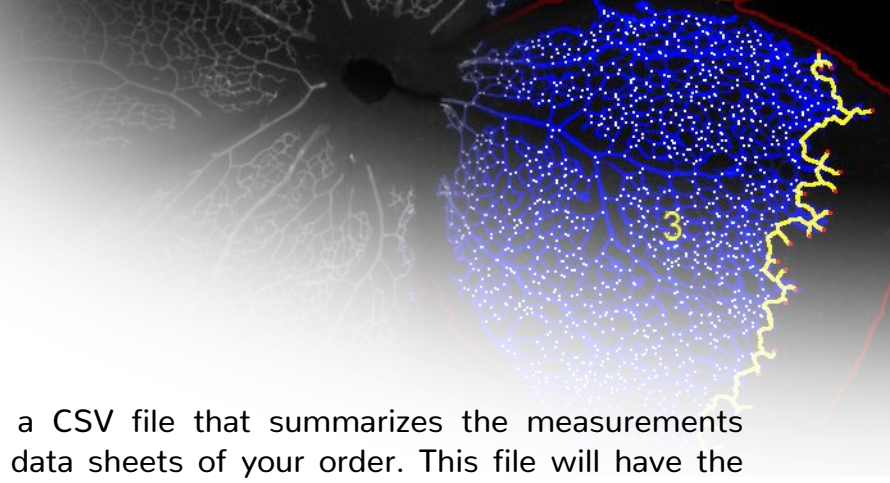
- **Vessels Density [%]:** The percentage of vessels structure in the whole ROI area of the image. It is calculated by dividing the total number of pixels of the ROI by the pixels that belong to the vessels structure.
- **Vessels Area [px]:** Total number of pixels corresponding to vessels region in pixels.
- **Vessels Area [px]:** Total number of pixels corresponding to the ROI.
- **Total Branching Points:** Count of branching points in the image. Branching points are parts of the skeleton where three or more segments converge.

Vessel Segments Characteristics:

- **Total Vessels Length [px] :** The complete length in pixels of the vascular tree.
- **Total Segments:** The number of segments in the image. In WimRetina, a segment is the part of the skeleton between two branching points or a branching point and a loose end.
- **Mean Segments Length [px]:** The arithmetic mean of all segments lengths.
- **Standard Deviation Segments Length [px].**

Loops Characteristics:

- **Total Loops:** Loop count in the image. A loop is an area of the background enclosed (or almost) by the vascular structure.
- **Mean Loop Area [px]:** For each loop, the area (number of pixels) enclosed by it is considered its area. The mean loop area is the arithmetic mean of all loop areas.
- **Standard Deviation Loop Area [px].**
- **Mean Loop Perimeter [px]:** For each loop, the pixels that belong to its edge (pixels that are in contact with the blue vessels structure) are considered as border or perimeter. The mean loop perimeter is the arithmetic mean of all loop perimeters.
- **Standard Deviation Loop Perimeters [px].**



3. Results Data Summary

Every uploaded order also produces a CSV file that summarizes the measurements contained in all the individual results data sheets of your order. This file will have the name of the order number followed by “_Summary”.