User Manual

1. Instructions for opening the application in Windows

a) Locate folder containing the application installer

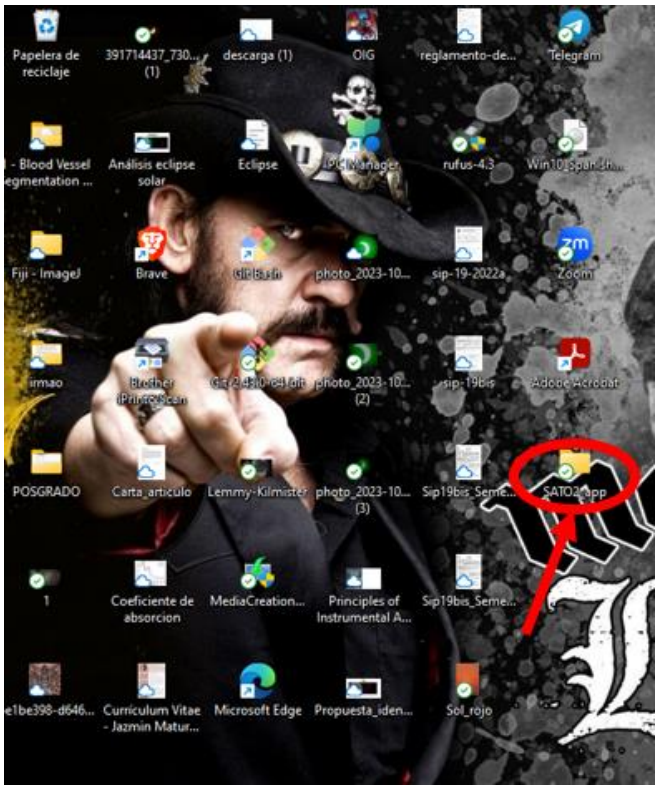

Figure 1. Identify the folder containing the application.

b) Open folder

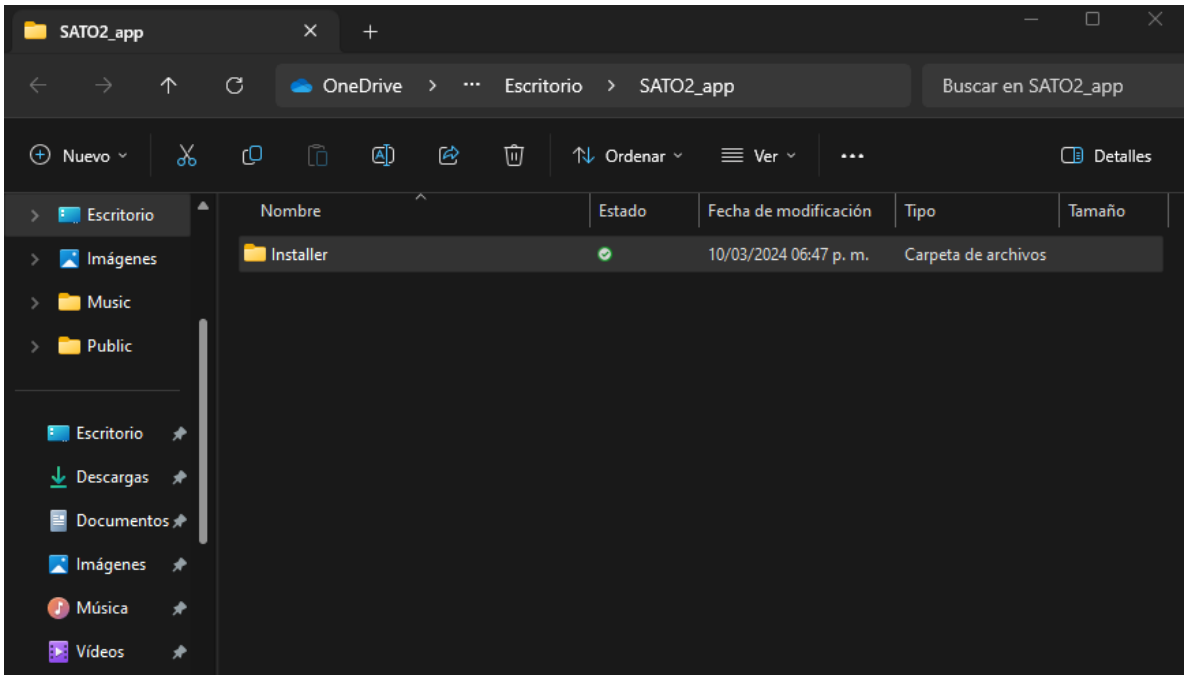

Figure 2. Opening the folder containing the application

c) Find application

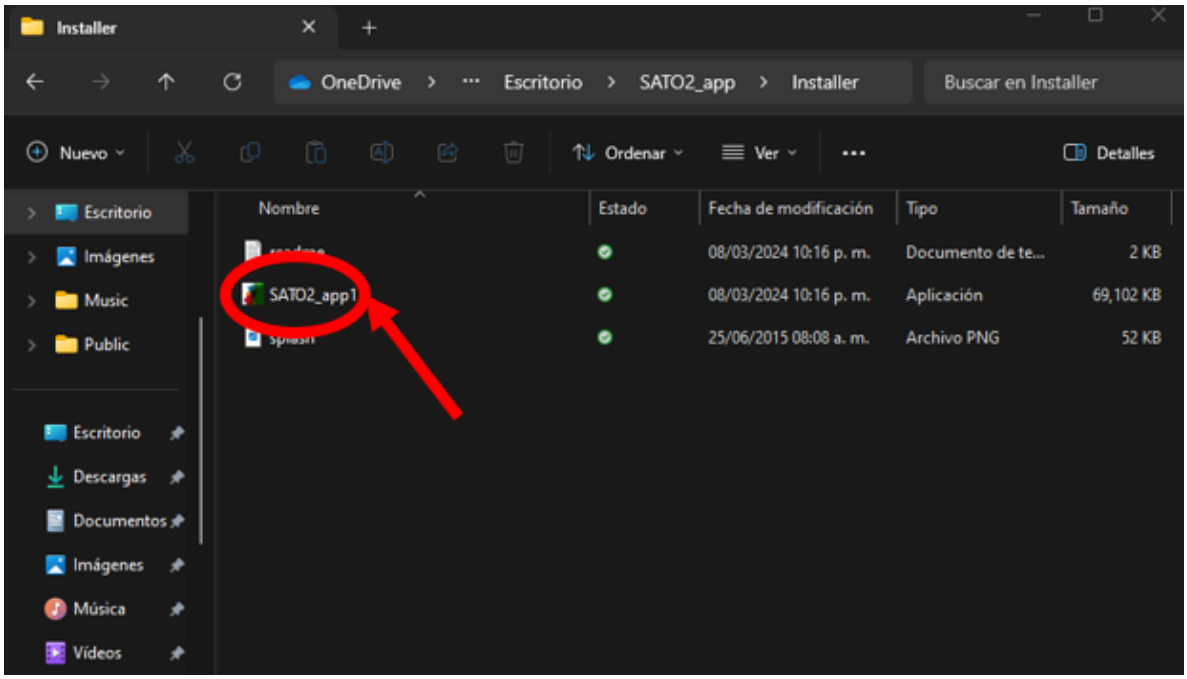

Figure 3. Finding the .exe executable of the application

d) Run the application

For this step it is necessary to double-click the installer to run the application. The application will automatically open.

Figure 4. Pop-up window when running the application.

2. Explanation of the functionality of the application

2.1. Explanation of the constituent parts of the application

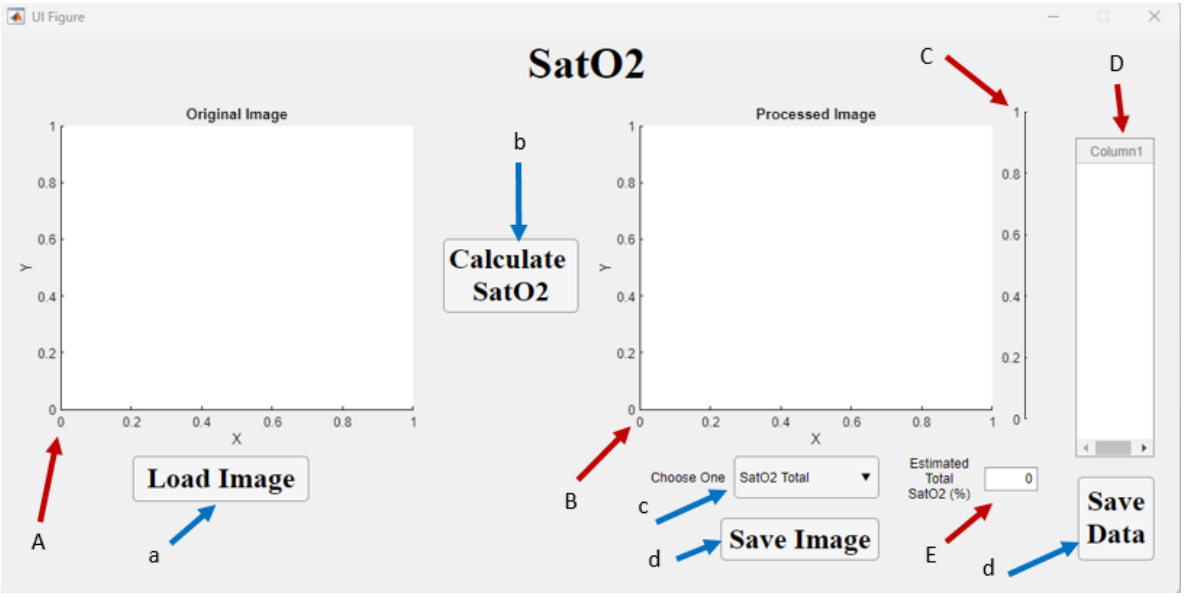

Figure 5. Pop-up window of the application with incised lines.

a. Load Image button, which oversees opening a file explorer to select the image to be analysed.
b. Calculate SatO2 button to perform oxygen saturation estimation calculations.

c. Choose One option which displays a list to select the image to be displayed at the end of the oxygen saturation estimation calculation.
d. Save Image button, which oversees opening a file explorer to select the place where you want to save the image with the colorimetric proposal.
e. Save Data button, which oversees opening a file explorer to select the destination place where the numerical values of the image with the colorimetric proposal will be stored.

A. Area in which the image selected by the Load Image button is displayed.
B. Area where the image with the colour scale is displayed when the Calculate SatO2 button is pressed. This area also displays the image selected by the Choose One option.
C. Area where a coloured bar is displayed indicating the percentage of oxygen saturation estimated numerically by pressing the Calculate SatO2 button, this bar starts at 0% and ends at 100%.
D. Table that will contain the numerical values of the image with the colour scale when pressing the Calculate SatO2 button. This area also displays the numerical data of the image selected by the Choose One option.
E. Area showing the oxygen saturation estimate after pressing the Calculate SatO2 button.

2.2. Load Image Button

The Load Image button means load image to be analysed. Pressing this button automatically opens a file explorer which must be directed to the folder containing the fundus images to be analysed. Once the folder containing these images is located, it is only a matter of double clicking until the image to be analysed is selected, as shown below.

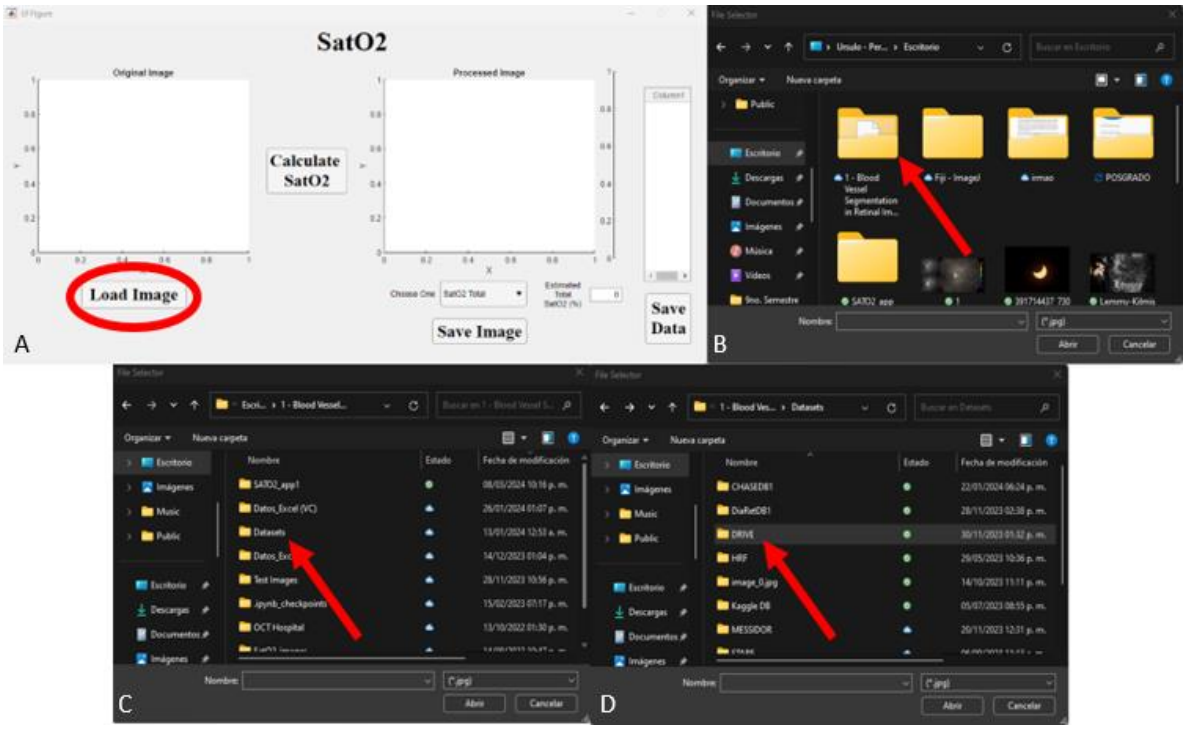

Figure 6. Steps to follow to load the image to be analysed. In (A) the Load Image button is pressed, which opens a file explorer (B), in which the folder containing the Datasets (C) or fundus images to be analysed (D) must be found.

Commonly when you get to the folder containing the images you wish to analyse, the folder is shown as an empty folder, but this is due to the formatting above Open and Cancel. The application recognises .jpg, .ppm, .png and .tif images, you need to switch to 'All Files' for the images to be displayed, as shown below.

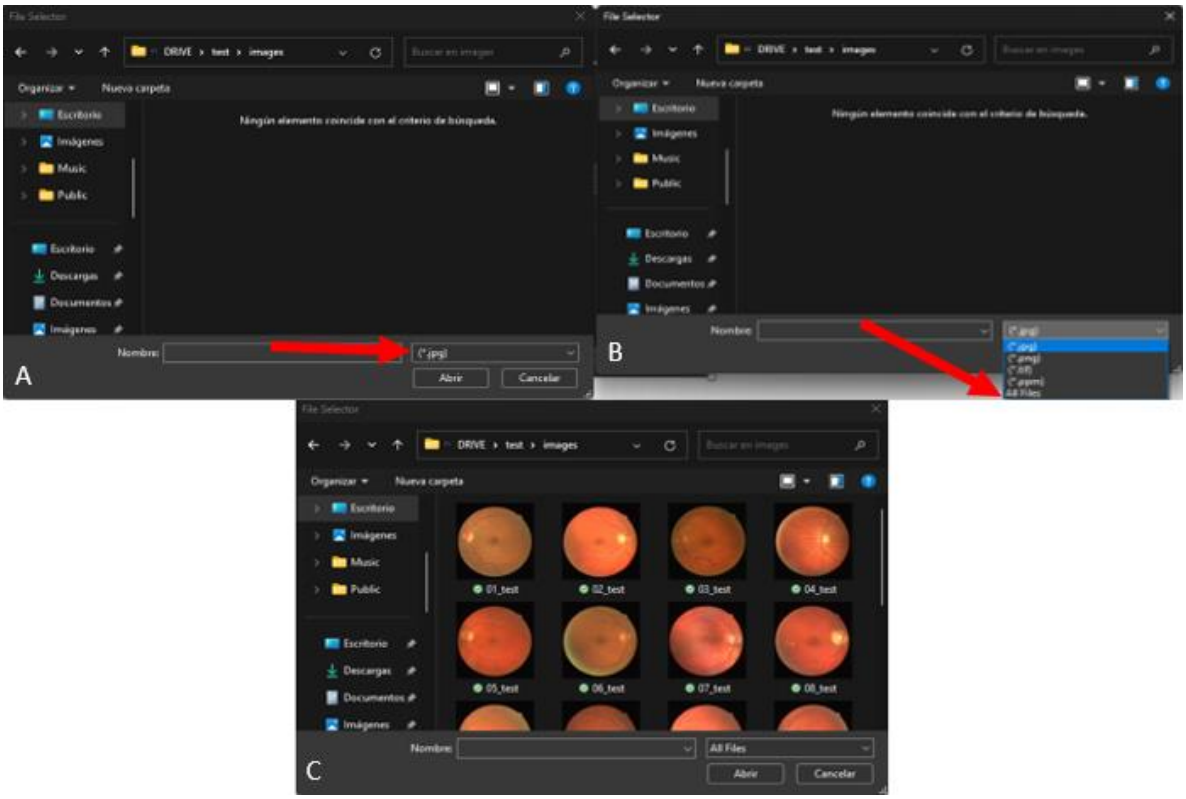

Figure 7. Steps to follow to load the image to be analysed. As mentioned, it is common that the folders appear empty (A), to solve this it is necessary to identify the drop-down menu which contains the image formats that the application is able to execute (B), when selecting the All Files option, all the images appear (C).

Once this is done, you can select the image you wish to analyse. Once selected, it will automatically appear in the application (NOTE: The time it takes to appear in the application varies depending on the computer with which the application is run).

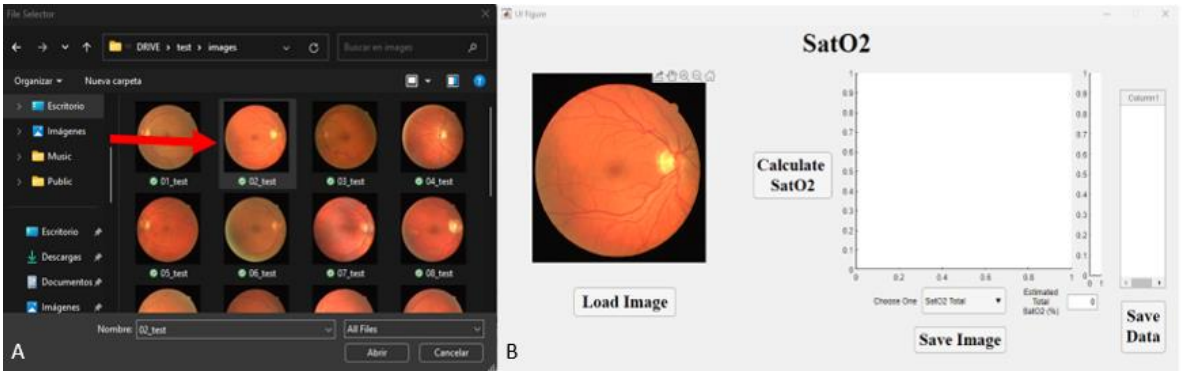

Figure 8. Steps to follow to load the image to be analysed. Once the option to view all files has been selected, it is necessary to choose the image to be analysed (A). Once the selection of the image has been completed (either by double clicking on the image or by selecting it and clicking on Open at the bottom of the file explorer window), the selected image is displayed in the application window.

2.3. *Calculate SatO2 Button*

Pressing the Calculate SatO2 button displays the colourimetric image of the colour mapping to the original image. The processed image shows only the ROI regions of interest in the image, i.e. the retinal microvasculature. The most important data regarding the processed image are displayed, as follows

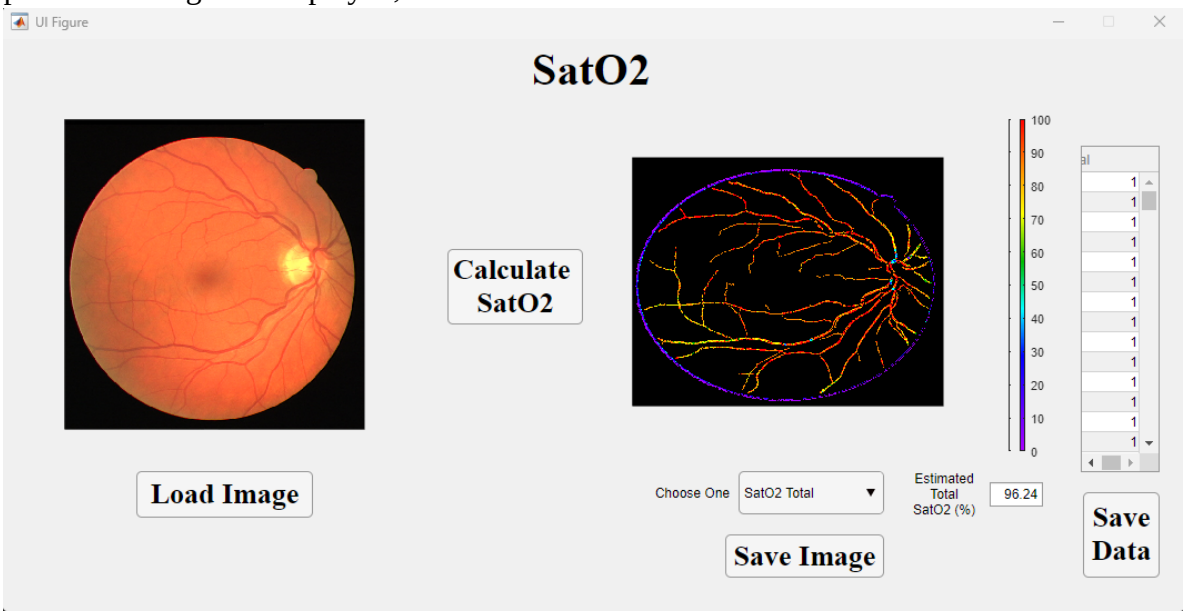

Figure 9. Window showing what happens when the Calculate SatO2 button is pressed. It is evident that when pressing it, the processed image appears, which contains the colour scale proposed to visualise the retinal microvasculature; in addition, the estimation of oxygen saturation in Estimated Total SatO2 (%) is shown as a percentage; a colourimetric reference bar is also shown to provide a tool that indicates which values have the zones with different colour scale; finally, a table containing the numerical values of the retinal microvascular zone is shown, which is used to perform the quantitative analysis and to obtain the Oximetric Density Function FDO.

2.4. *Choose One Option*

The Choose One option displays a menu in which the colourimetric proposals for total oxygen saturation, arterial, arterial-venous and venous oxygen saturation are displayed. The estimated percentage is also displayed in the Estimated Total SatO2 section. A colourimetric reference bar is also shown where the colourimetric oxygen saturation scale is indicated and finally a table, which will contain the data of the option chosen in the Choose One option. For example, if the Total SatO2 option is chosen, all the numerical data (data vector) of this option is shown in the table, however, if the Vein SatO2 option is selected, the data vector of this zone is shown. This is shown below.

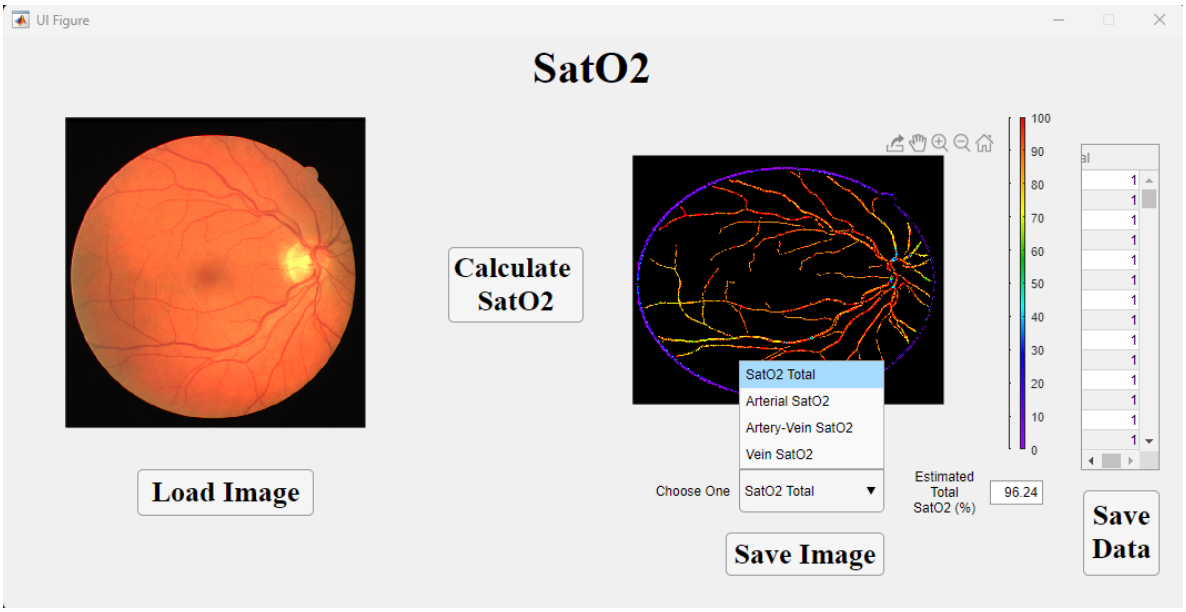

Figure 10. Window showing the drop-down menu in the Choose One option of the application, which displays Total SatO2, Arterial SatO2, Artery-Vein SatO2 and Vein SatO2.

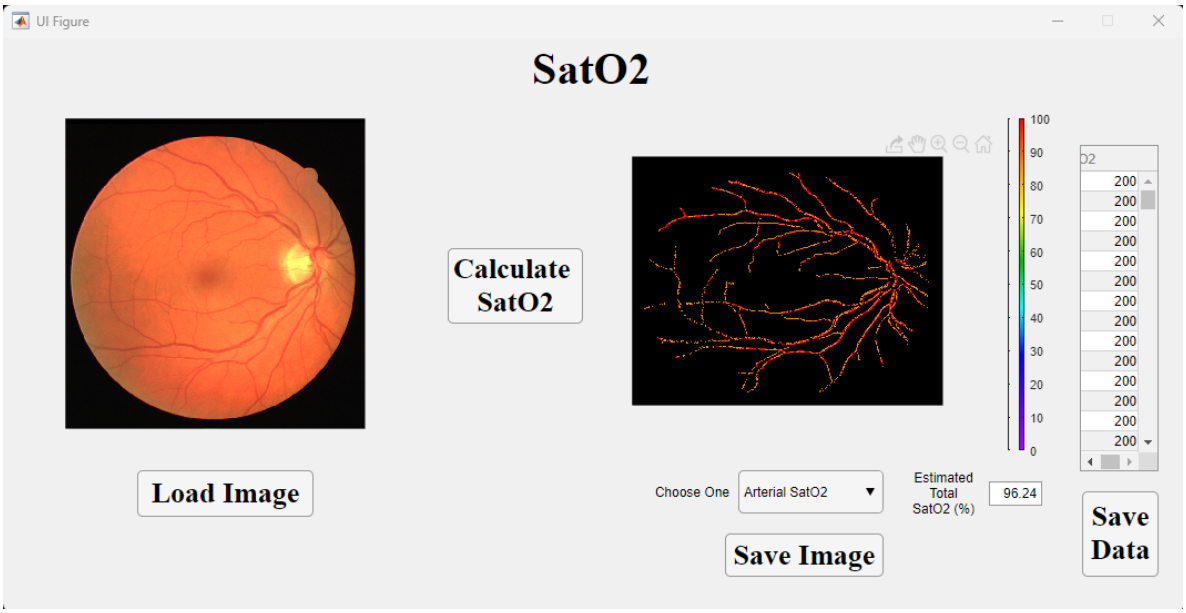

Figure 11. Window that the choice of the Arterial SatO2 option, which (as shown in Figure x), contains the resulting image of the zone proposed as arterial, the estimated total saturation in percentage (NOTE: this zone shows only the estimated total saturation and does not show for the moment the saturation estimated by the selected options); also, the table containing the numerical values of the zone proposed as arterial is shown.

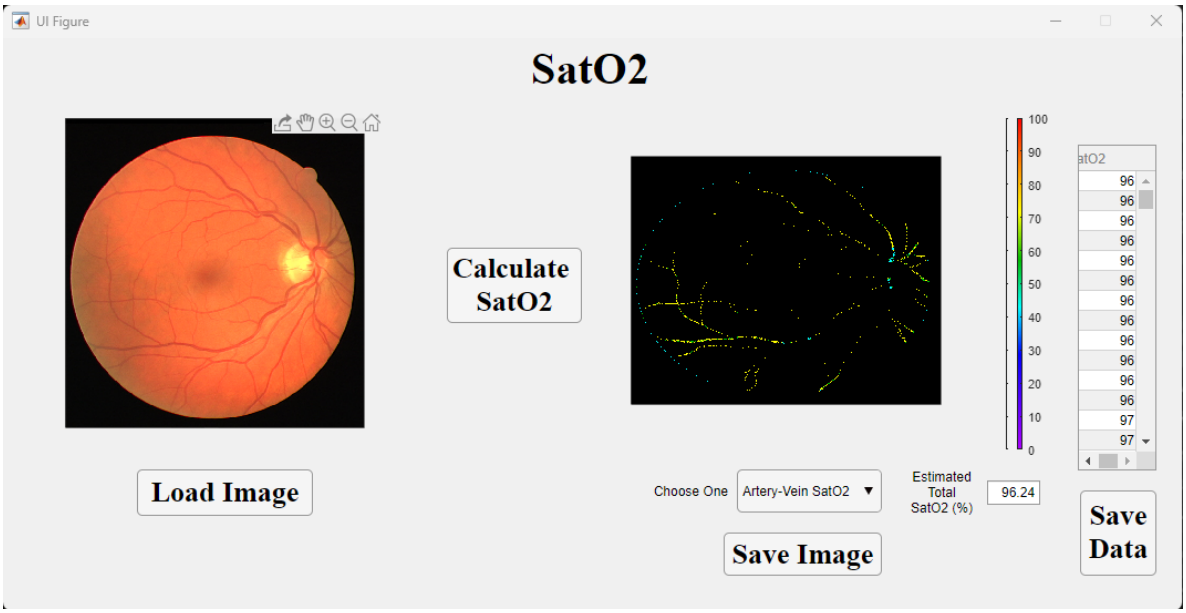

Figure 12. Window containing the Artery-Vein SatO2 option, which contains the resulting image of the proposed zone as blood containing an amount of oxygen that is in the transition of losing it, the estimated total saturation in percentage (NOTE: this zone shows only the estimated total saturation and does not show the saturation estimated by the selected options for the moment); also, the table containing the numerical values of the proposed zone is shown.

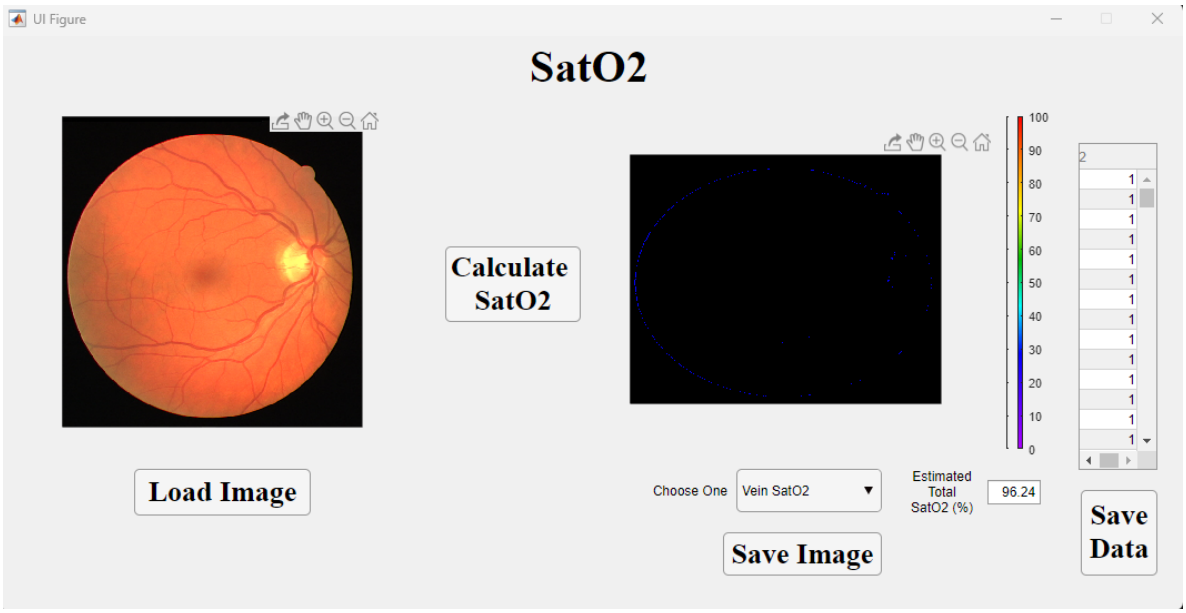

Figure 13. Window that selects the Vein SatO2 option, which contains the resulting image of the proposed venous zone, the estimated total saturation in percentage (NOTE: this zone shows only the estimated total saturation and does not show for the moment the saturation estimated by the selected options); also, the table containing the numerical values of the proposed zone is shown.

2.5. *Save Image* and *Save Data Button*

As in the same case of the Load Image button, the Save Image button, when pressed, displays a file selector, which allows you to select the folder in which you want to save the image, as well as give it the desired name and the format in which the image is saved (.jpg, .png, .ppm, .tif). As shown below

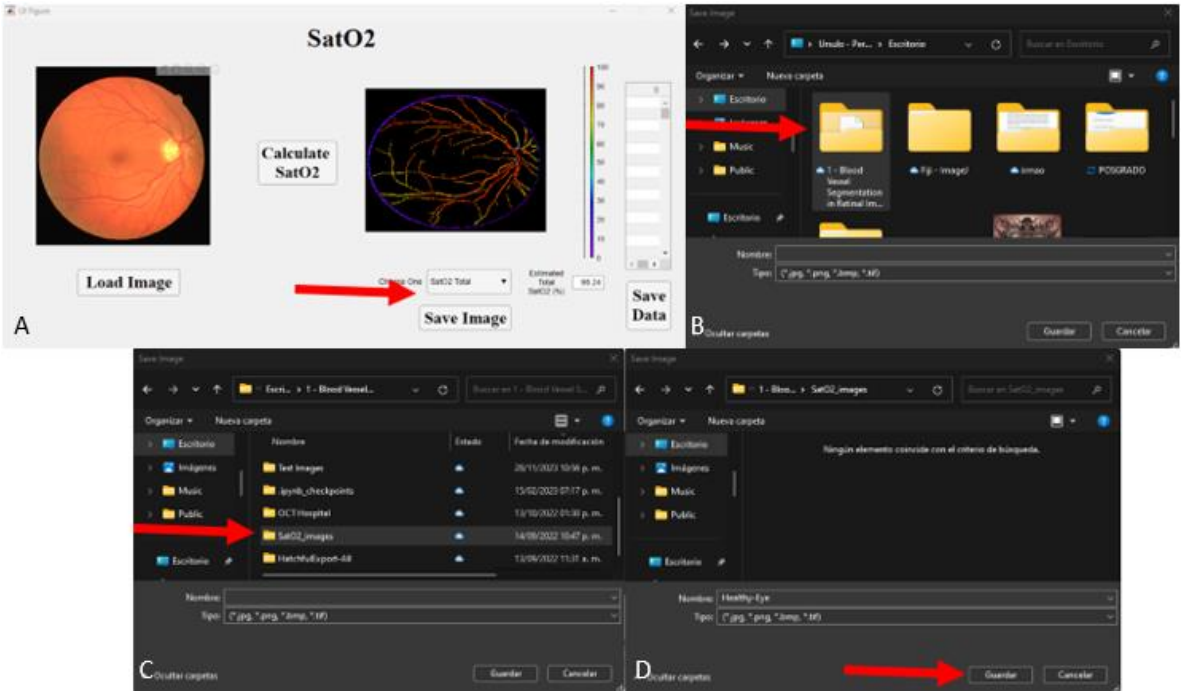

Figure 14. Steps to follow to save the analysed image. In (A) press the Save Image button, which opens a file explorer (B), in which the folder in which you want to save the image must be searched (C), where you can save it with the name of your choice (D).

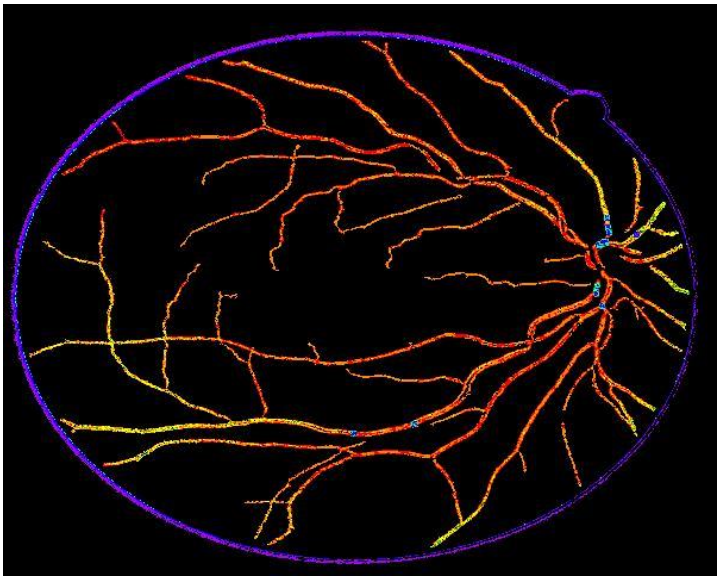

Figure 15. Sample of stored image.

In the same way as the Save Image button, pressing it displays a file selector, which allows you to select the folder in which you want to save the data, as well as to give it the desired name and the format in which it is saved (.xlxs, .csv). As shown below

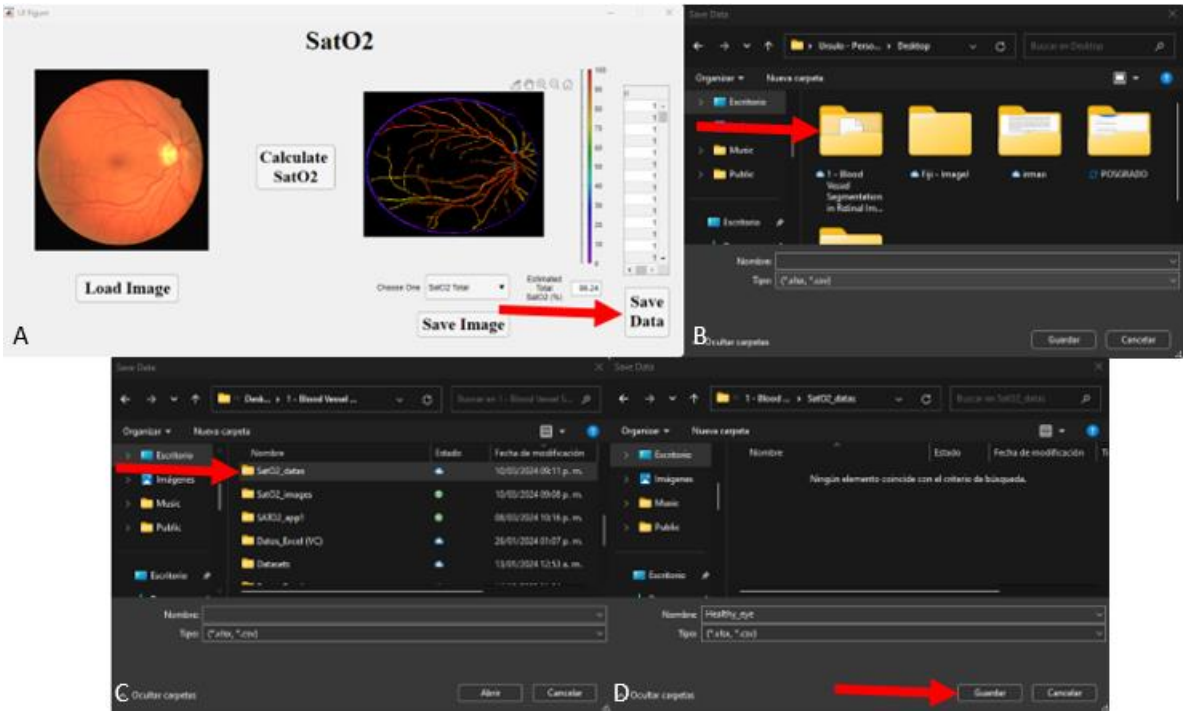

Figure 16. Steps to follow to save the data of the analysed image. In (A) you press the Save Data button, which opens a file explorer (B), in which you must look for the folder in which you want to save the file (C), where you can save it with the name you want (D).

	A
1	1
2	1
3	1
4	1
5	1
6	1
7	1
8	1
9	1
10	1
11	1
12	1
13	1
14	1
15	1
16	1
17	1
18	1
19	1
20	1
21	1
22	1
23	1

Figure 17. Sample numerical data vector of the stored image.