



# An interactive Matlab<sup>®</sup> interface for manual dermoscopic image analysis

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## INTRODUCTION

Dermoscopy is a non-invasive diagnostic technique for the *in vivo* observation of pigmented skin lesions. Currently there is a great interest in the development of computer-aided diagnosis systems that can assist the clinical evaluation of dermatologists. The validation of these algorithms requires a ground-truth database of manually segmented images.

Therefore, in this work, we present a graphical user interface for manual segmentation of dermoscopic images. Besides the manual segmentation of the lesion, this tool also allows segmenting other specific regions of interest whose recognition is crucial for skin lesion classification.

## INTERFACE DESCRIPTION

This interface allows performing the manual segmentation of dermoscopic images and storing the result of segmentation. Its main functionalities are:

- Image upload and display
- Manual segmentation
- Boundary reshaping
- Storage of segmented image

The interface was implemented in a MATLAB<sup>®</sup> environment (7.9.0 R2009b) because of its image processing toolbox and graphical facilities.

## CONCLUSION

The tool presented in this poster is still a preliminary version. Its final version will allow building up a reliable ground truth database of manually segmented images. This interface has some advantages with respect to other existing annotation tools, namely better freehand drawing and boundary reshaping functionalities.

As future work, we aim to include the possibility (by default) of labeling the different regions of interest.

## ACKNOWLEDGMENTS

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## Manual segmentation

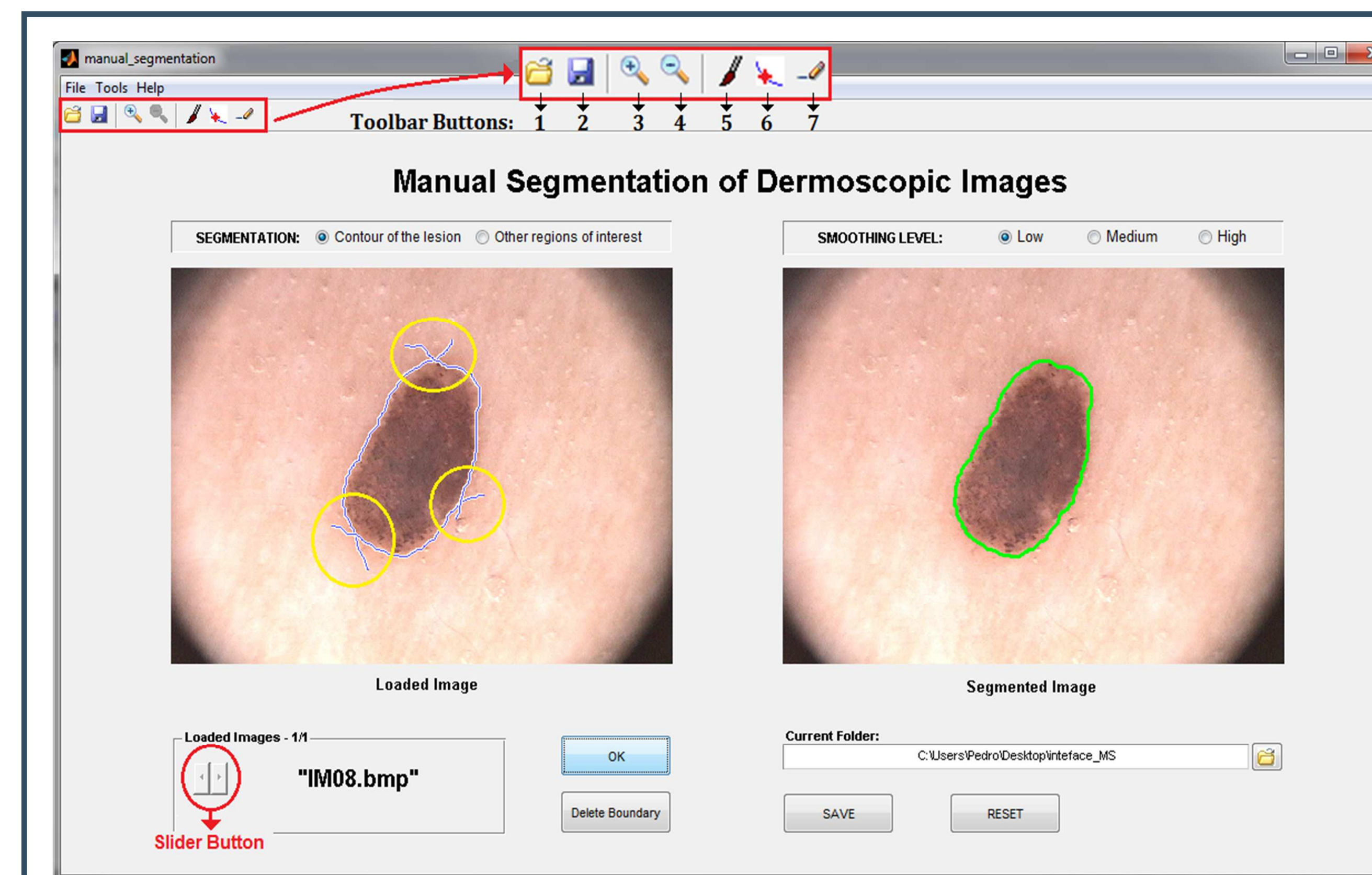


Figure 1 – Image on the left: initial contour drawn by the user, with some undesirable extra lines (marked with yellow circles). Image on the right: final contour after morphological filtering.

This application allows to draw a freehand region of interest on the loaded image. When the user interrupts the contour drawing, the contour remains open. However, while the contour is open there is the possibility of resuming drawing until the user completes and closes the contour, Figure 1.

Other available manual segmentation tools, such as ImageJ, do not have this possibility, since when the drawing is interrupted the contour is automatically closed with a straight line between the beginning and the end point.

To obtain the final contour from the initial one (drawn by user), a binary mask of the initial contour is first created, and then a morphological filtering is applied to this binary mask.

## Boundary reshaping

**Pointwise boundary reshaping:** This method should be used to make small adjustments in the contour, because the reshaping is done point-by-point. When the user selects this tool, the boundary automatically turns red with some control points. From these control points it is possible to change the shape of the contour. For this, the user must click and drag the control points to their new positions, Figure 2.

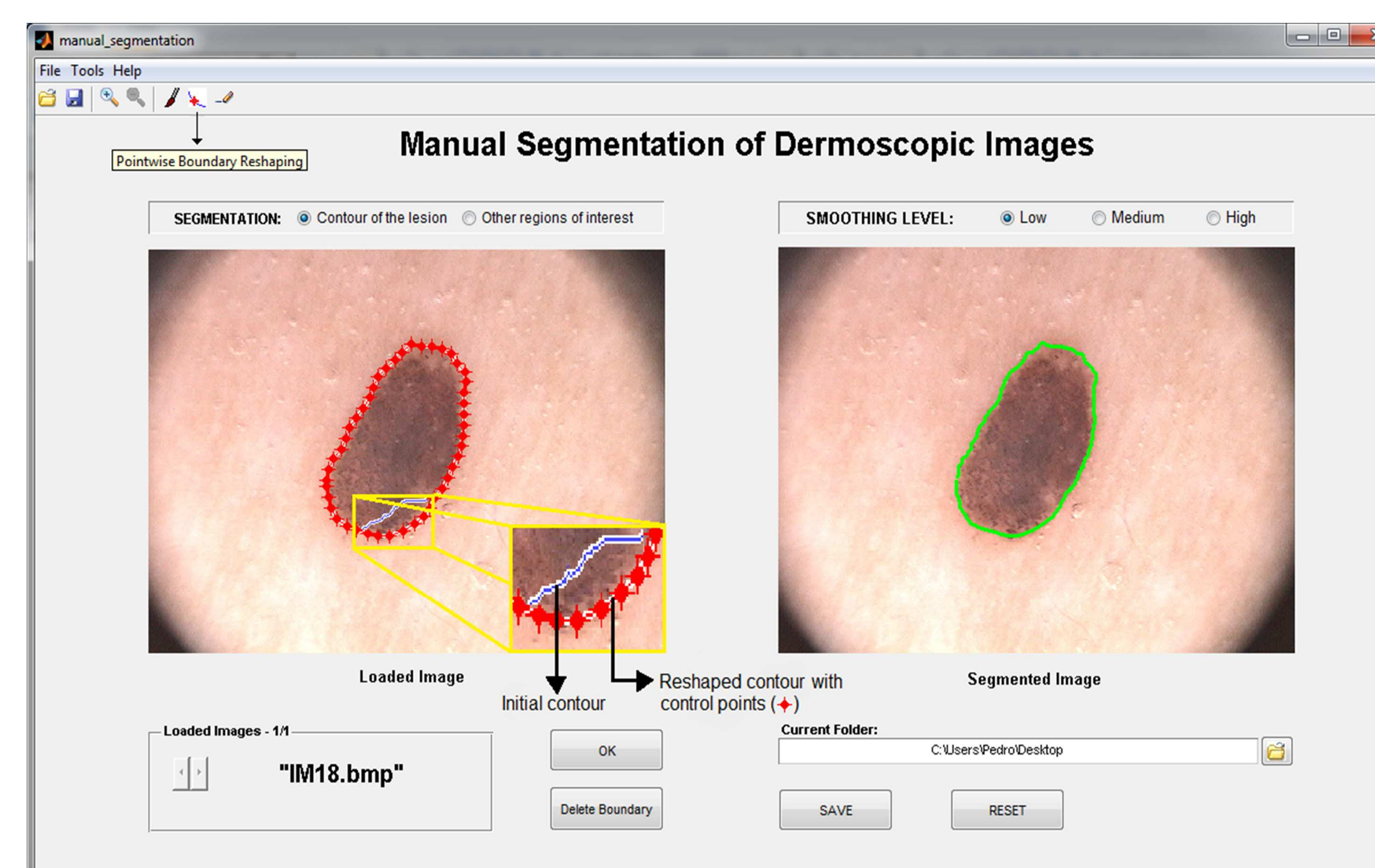


Figure 2 - Pointwise boundary reshaping.

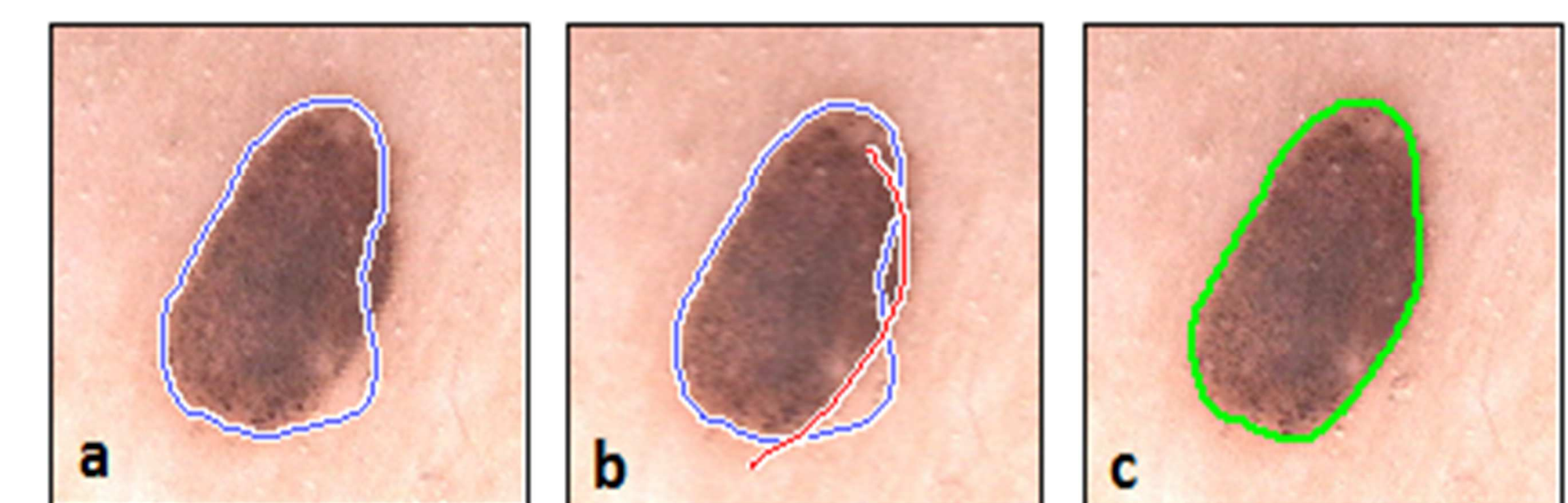


Figure 3 - Local boundary reshaping.

**Local boundary reshaping:** This functionality must be used when it is necessary to make great adjustments to the initial contour. Basically, this method allows to draw a line to define the new shape of the contour. The line must intersect the initial contour at least in two points to form a closed contour, Figure3.