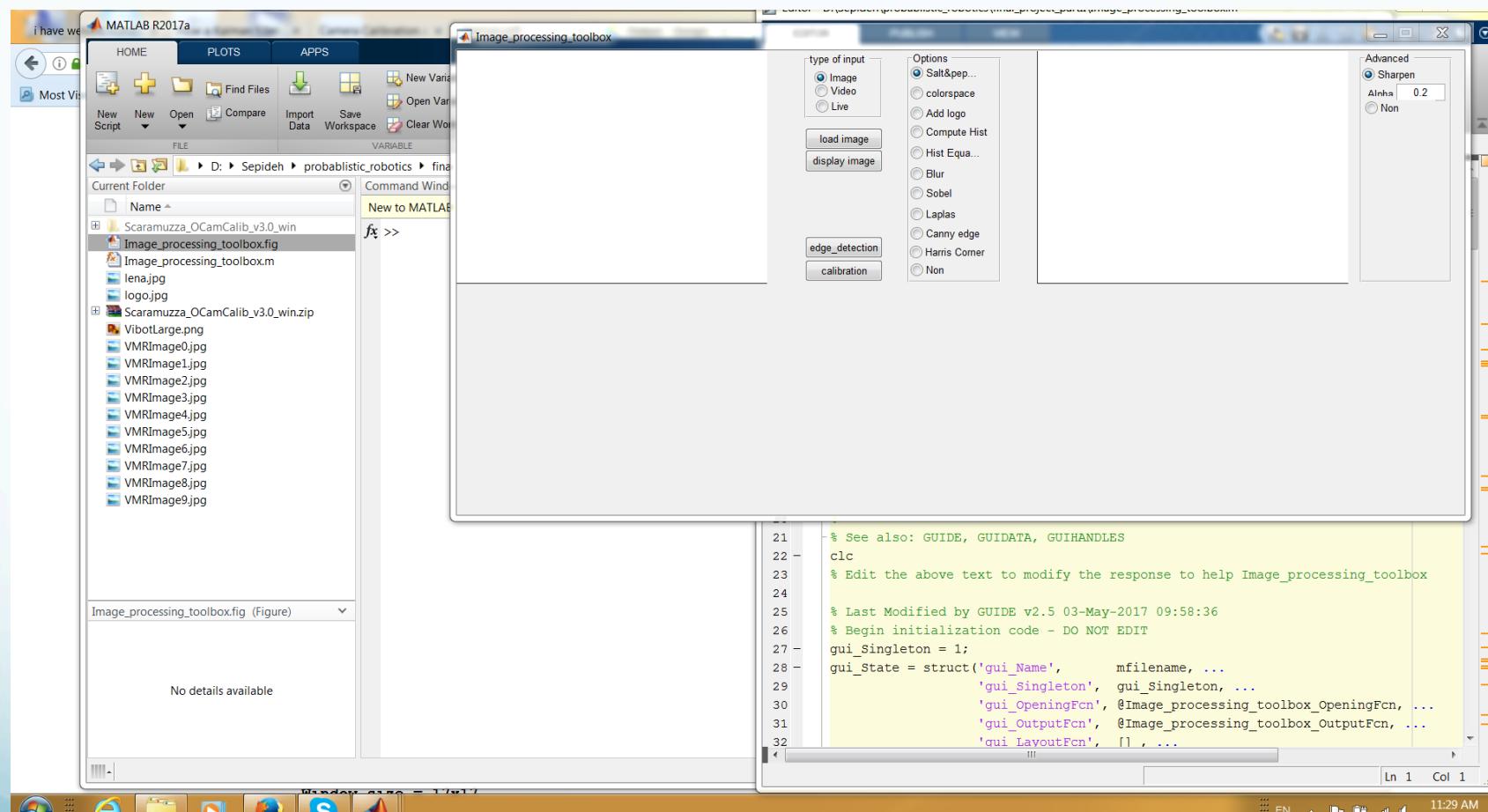


MATLAB and OpenCV toolbox for computer vision

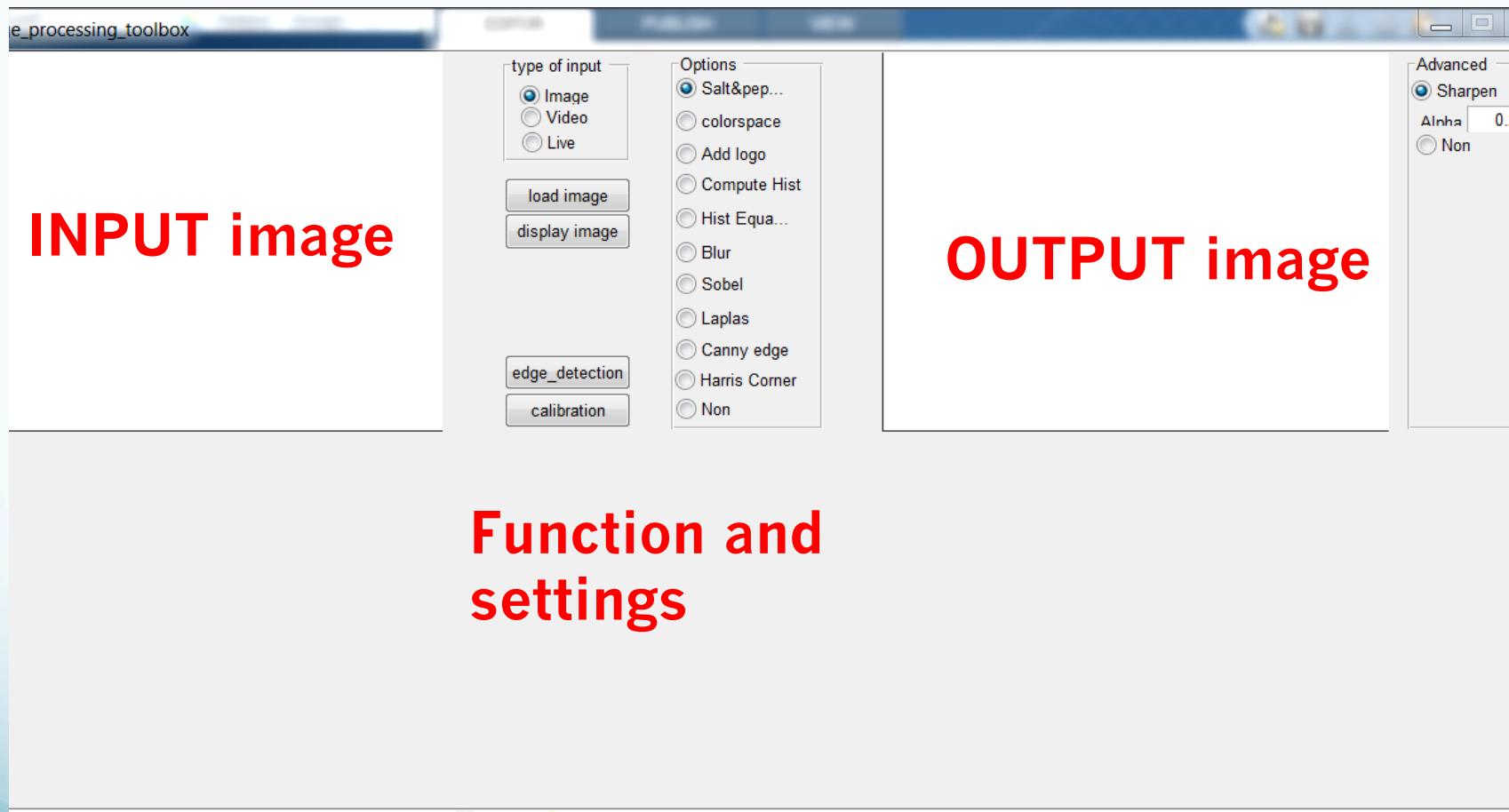
Sepideh Hadadi, Master MScV semester 2,
Visual perception module, Condorcet, Le Creusot,
France, 7 June 17

MATLAB: Main GUI



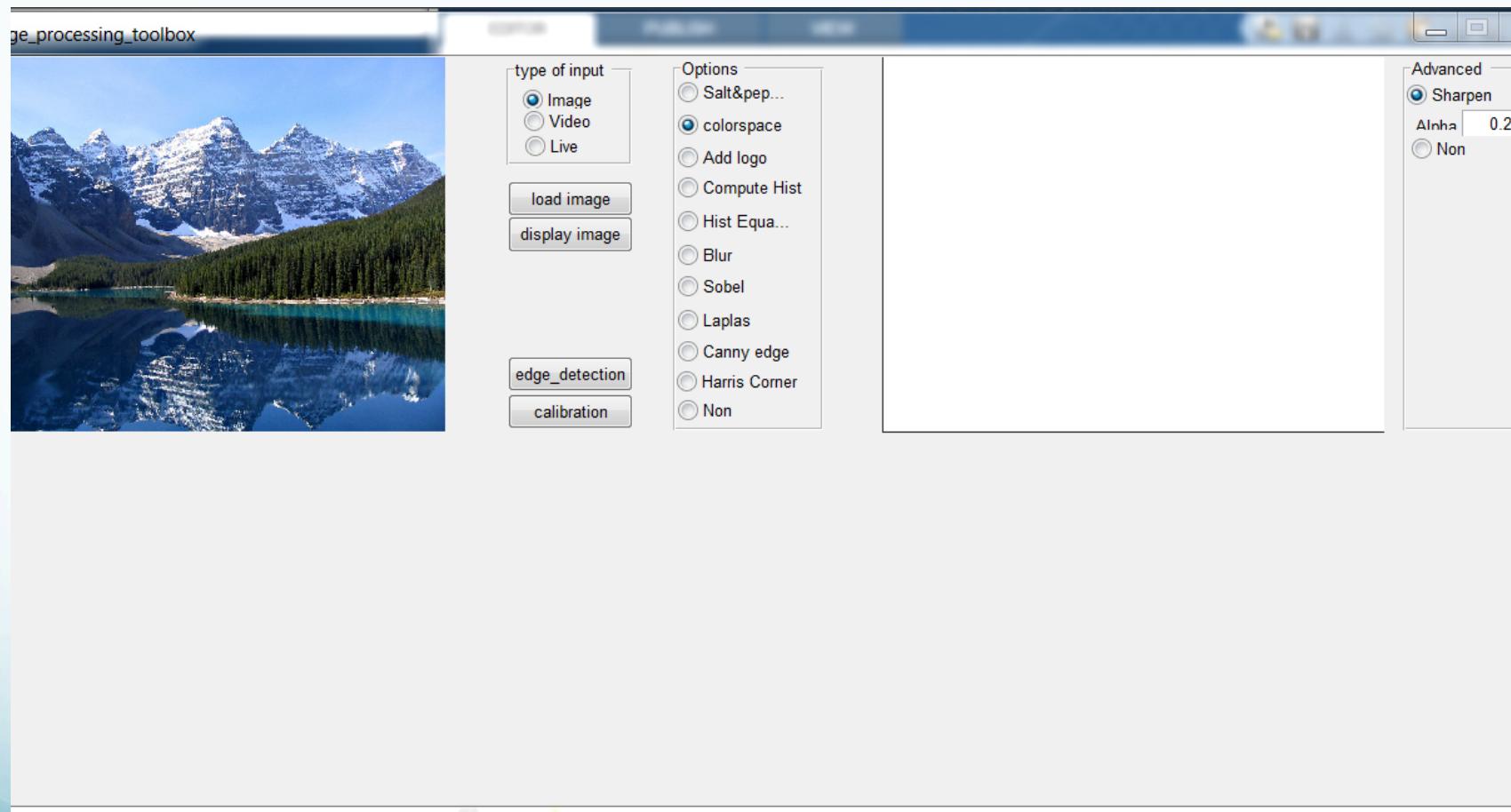
The main GUI is launched in MATLAB

Main GUI



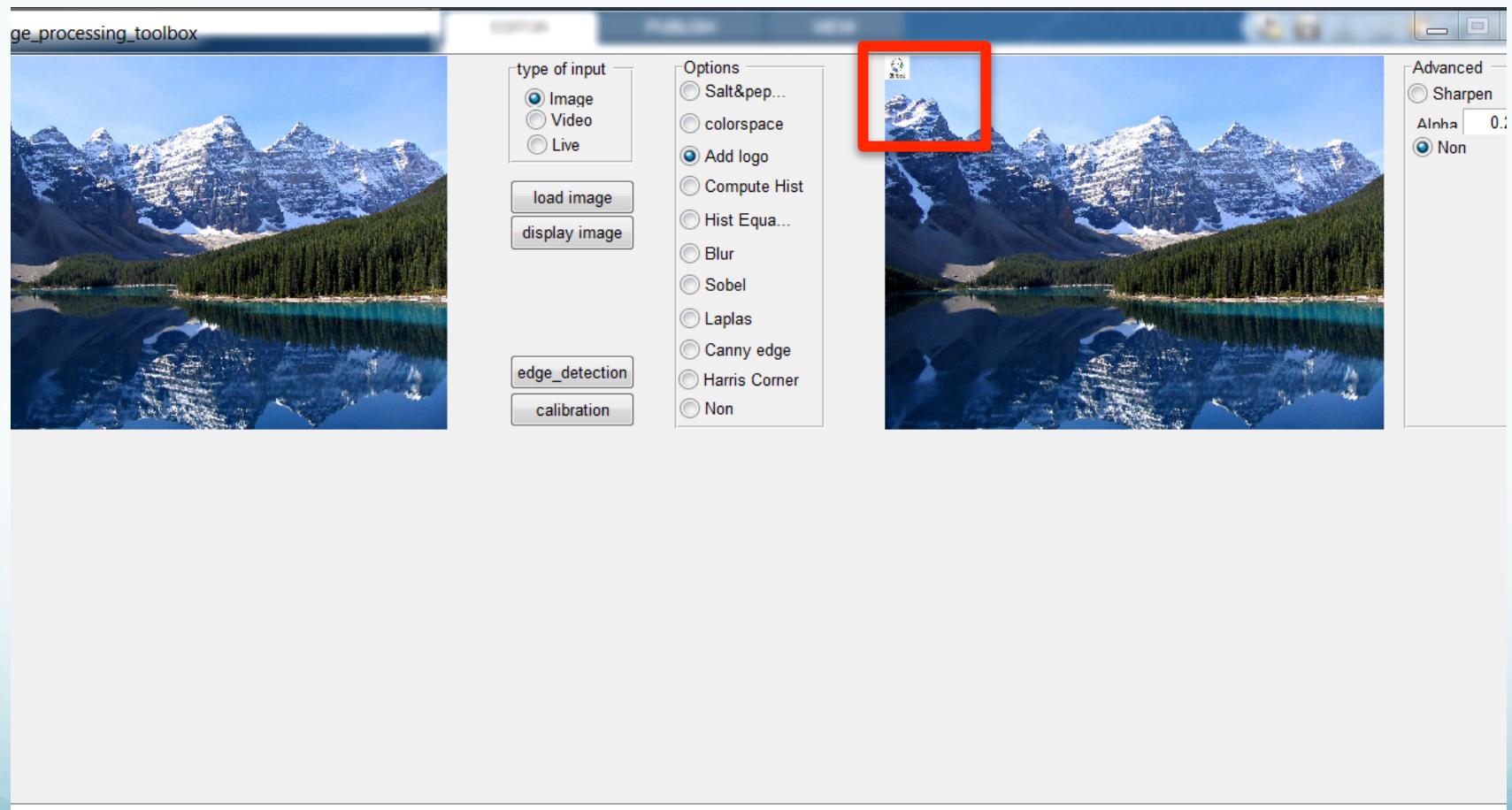
GUI has three main part, input/output image and navigation radio and buttons

Loading input image



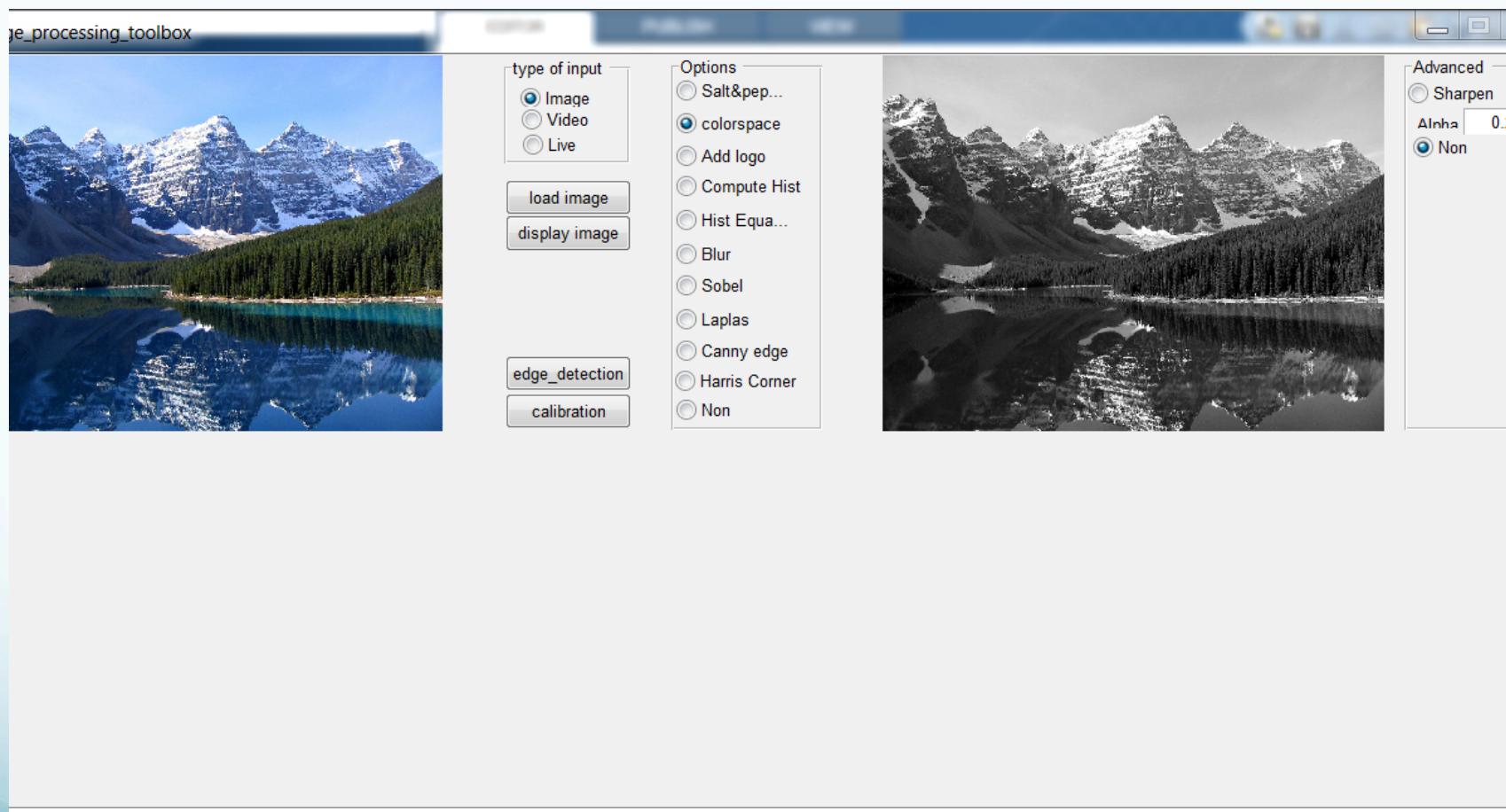
Load input image and select function

Adding logo



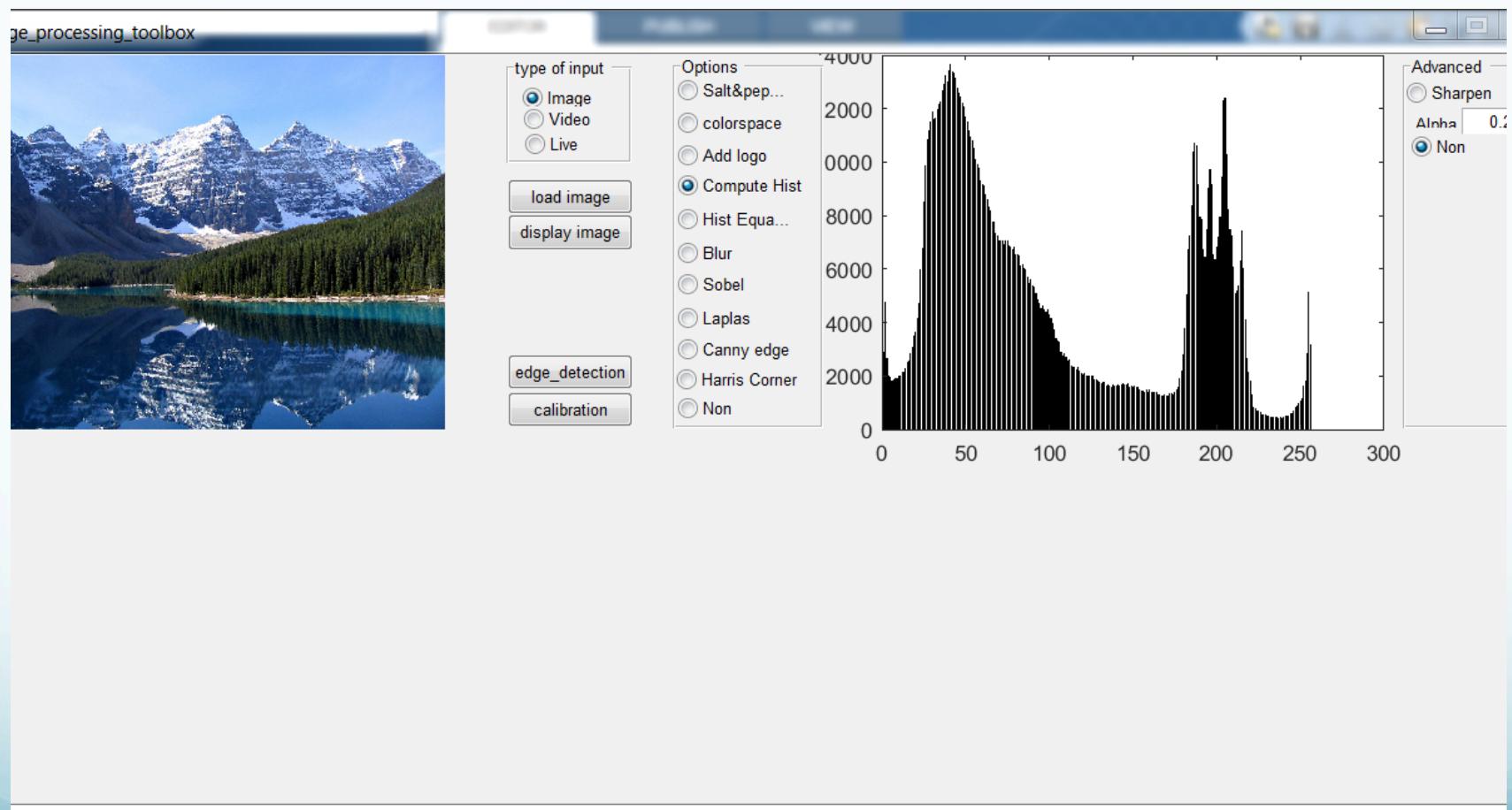
VIBOT logo in the left corner of the image

Change color space

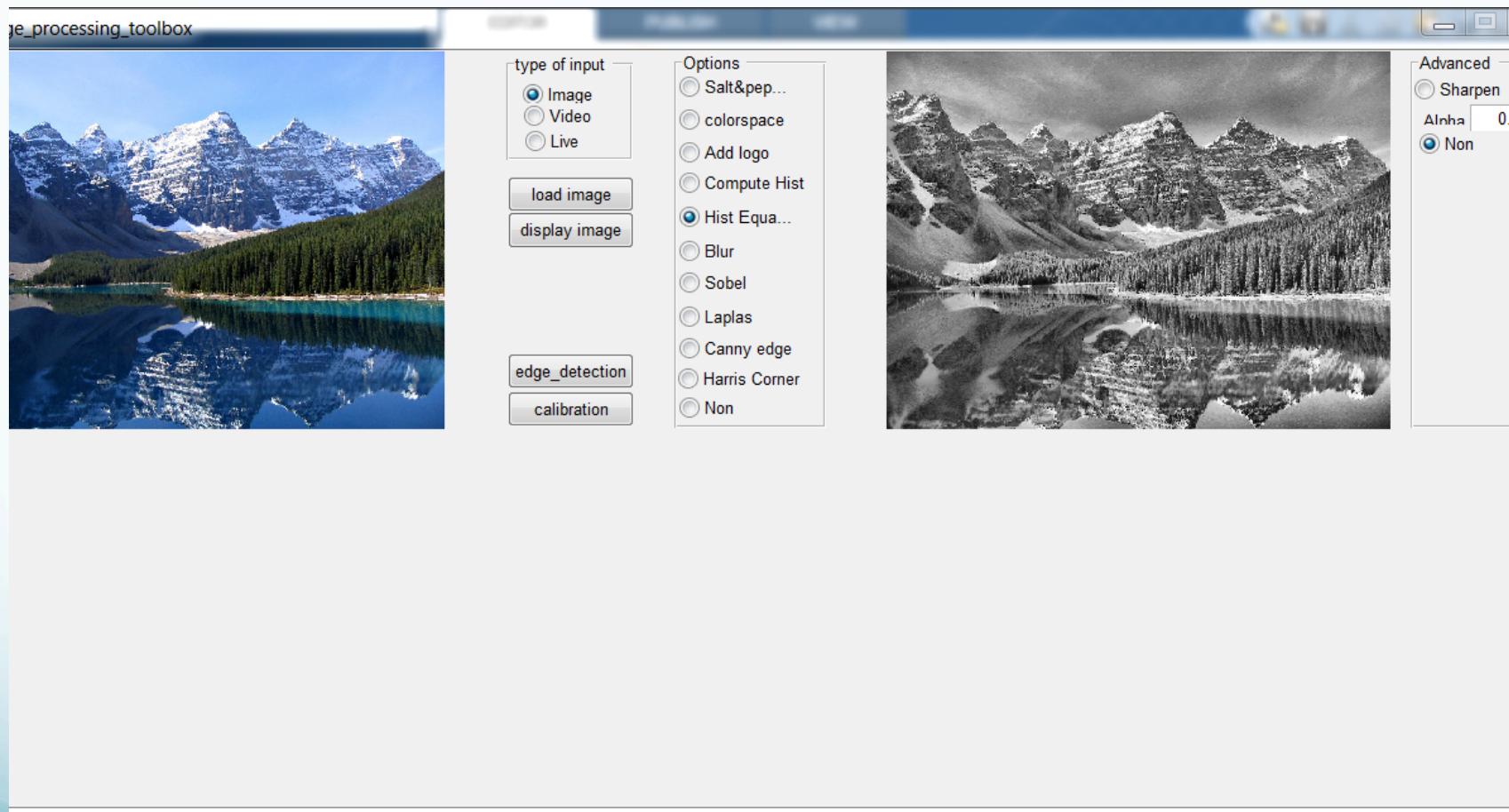


At the moment only rgb to gray level

Compute histogram



OpenCV: main Menue



Histogram equalization

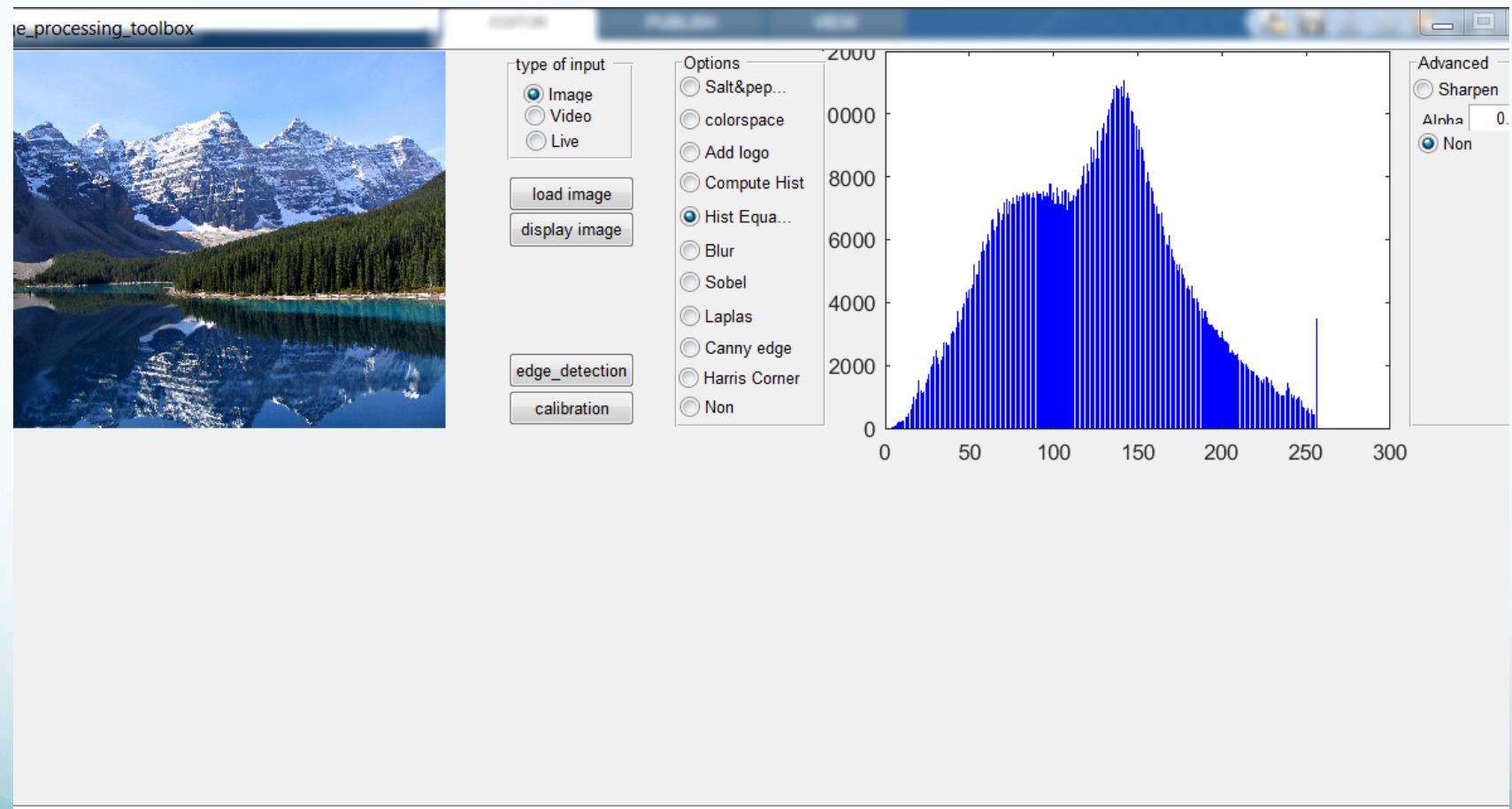
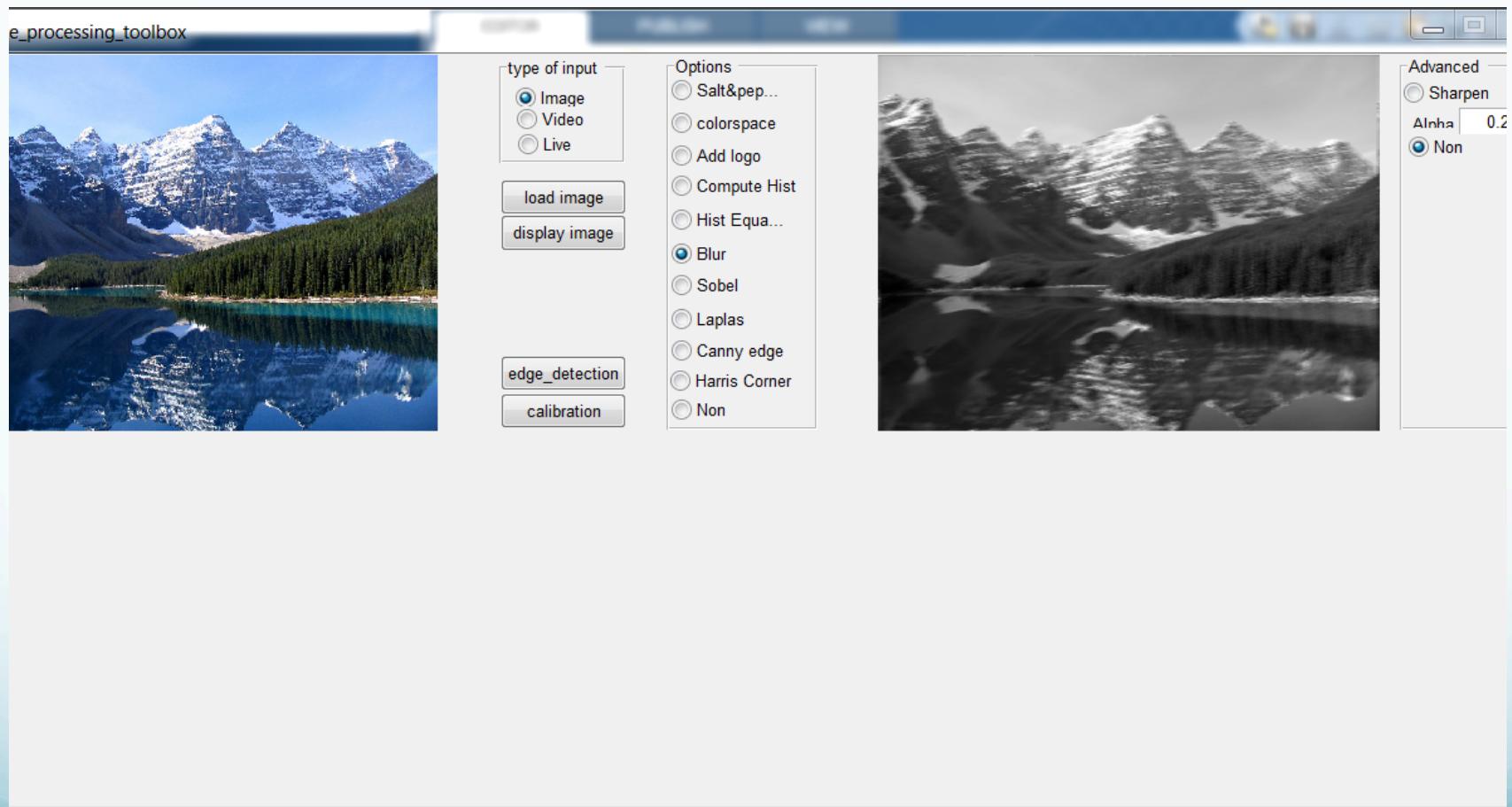
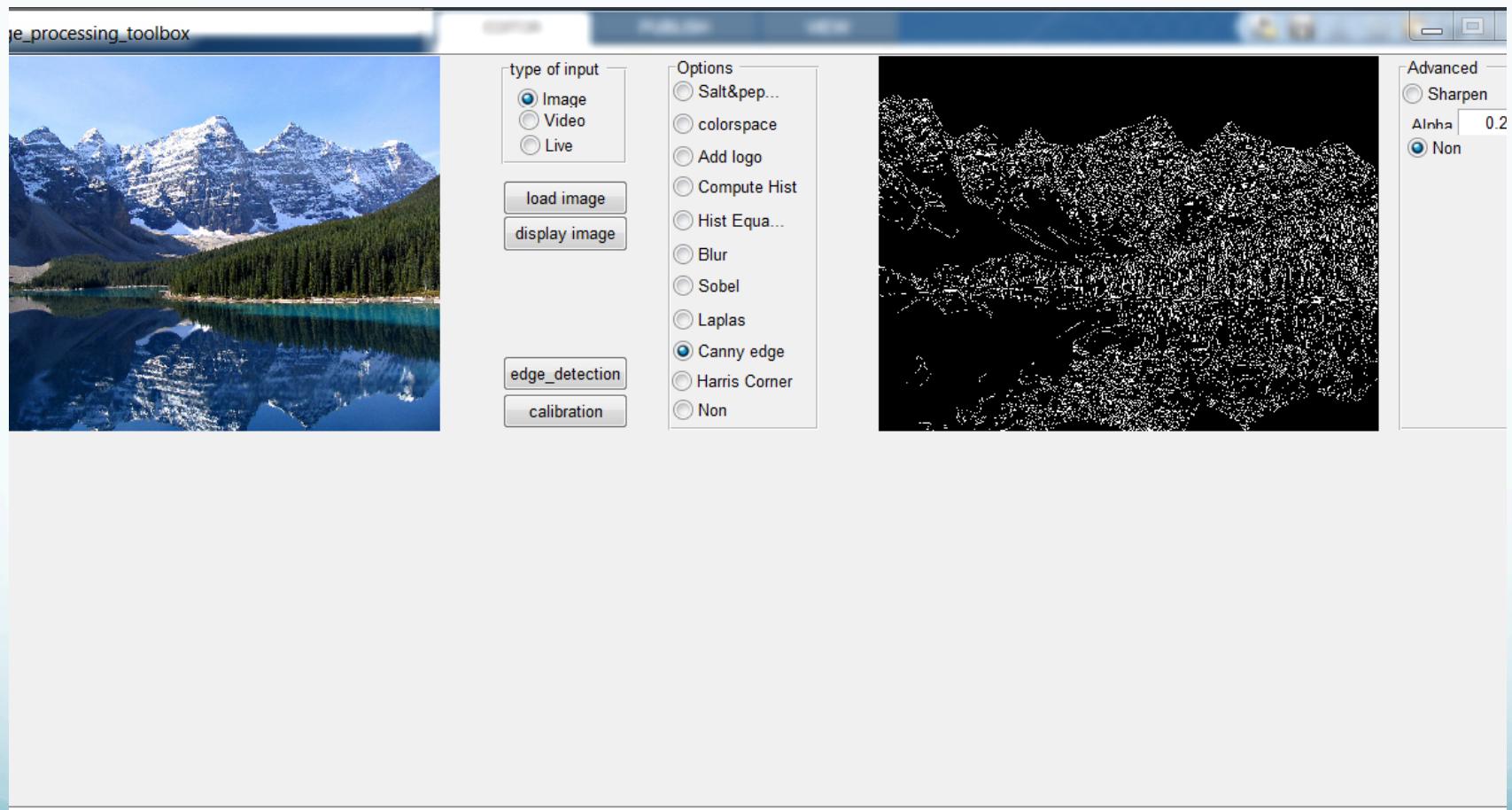


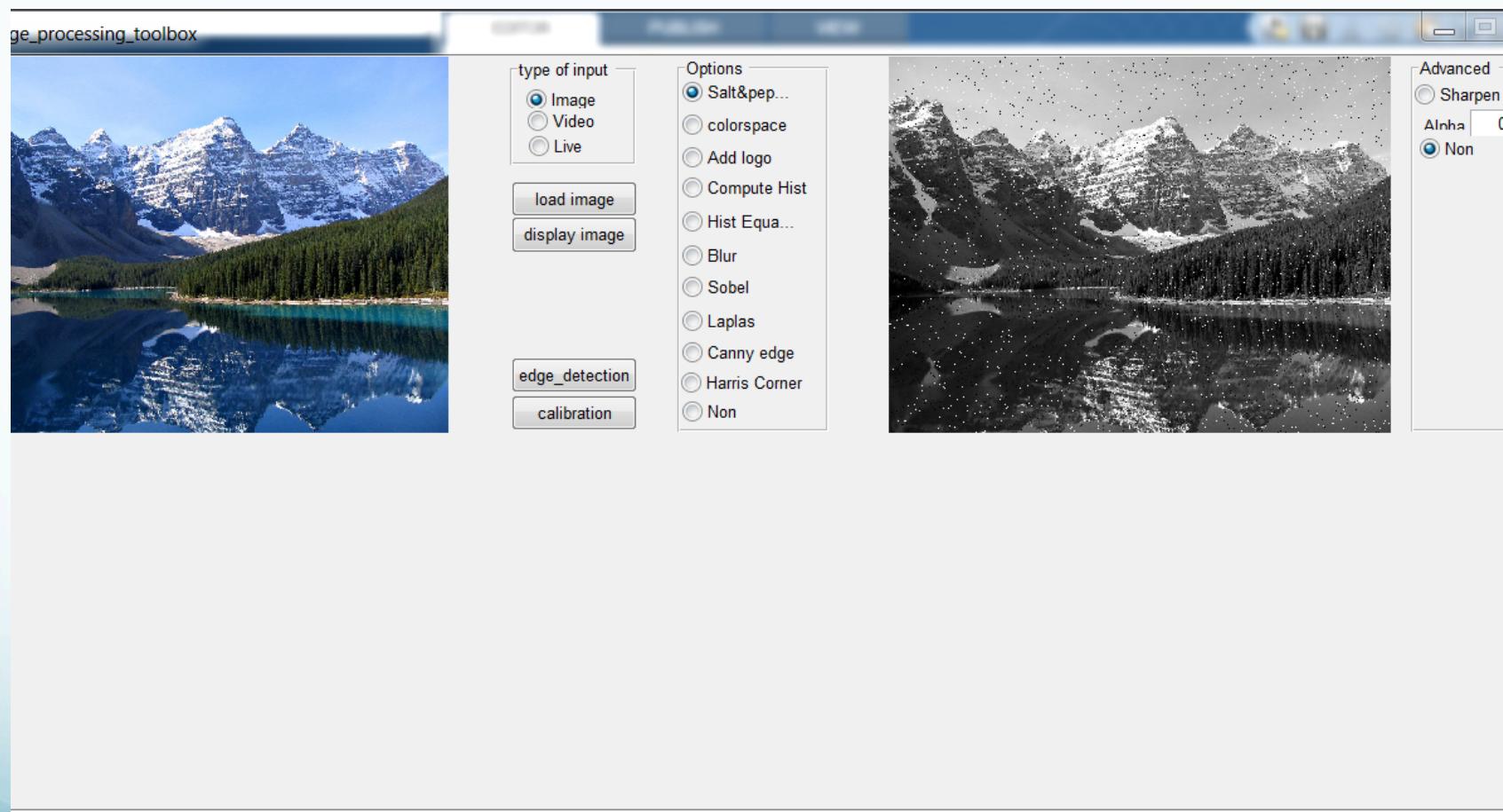
Image bluring



Canny edge detection

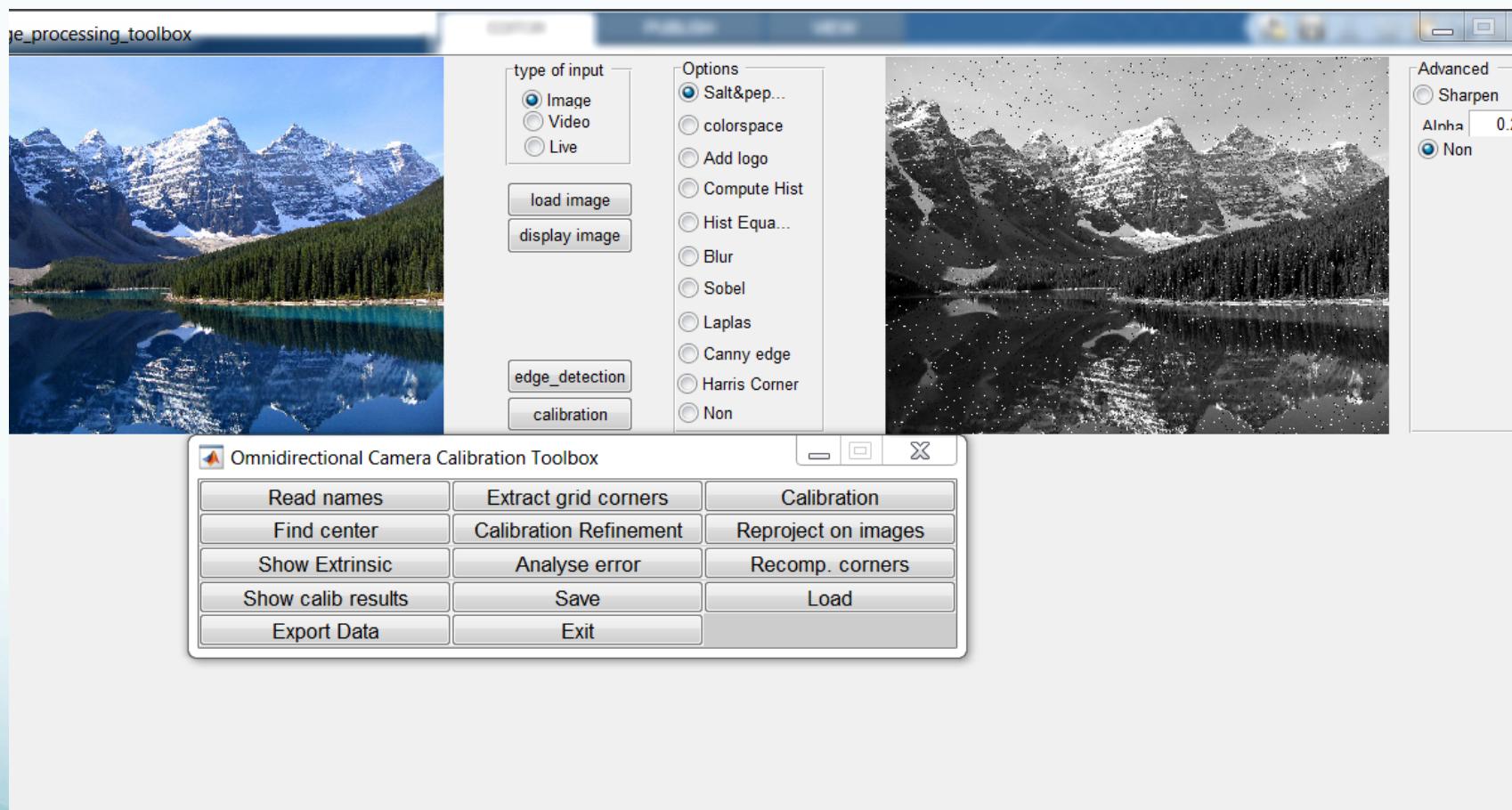


Adding noise to input image

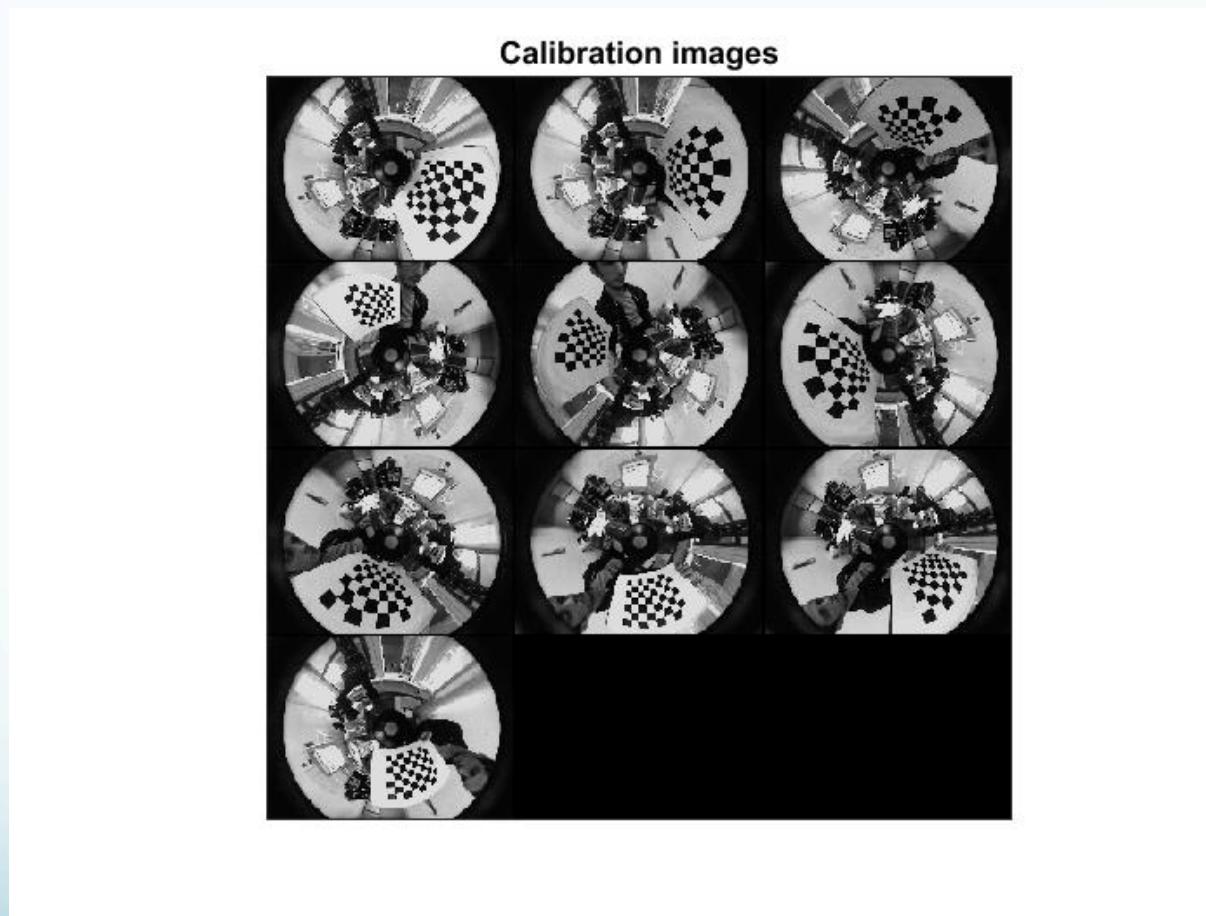


Salt and pepper noise selected and added to the input image

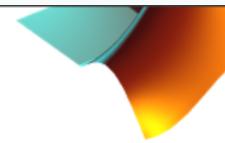
Camera calibration toolbox



Loading image in the calibration toolbox



More information about camera calibration



Download OCamCalib v3.0.zip

Includes Automatic Corner Extraction and undistortion functions (Matlab & C/C++)

This toolbox is currently used by **NASA, PHILIPS, BOSCH, DAIMLER**

Please report any bug, question, suggestion to the Google group: [ocamcalib-toolbox \(at\) googlegroups \(dot\) com](mailto:ocamcalib-toolbox@googlegroups.com) or to the group [webpage](#)

This Toolbox was partially inspired by the "Caltech Calibration Toolbox" by Jean-Yves Bouguet

TUTORIAL

Please read this tutorial very carefully before contacting me for help.

1. Introduction to the Toolbox

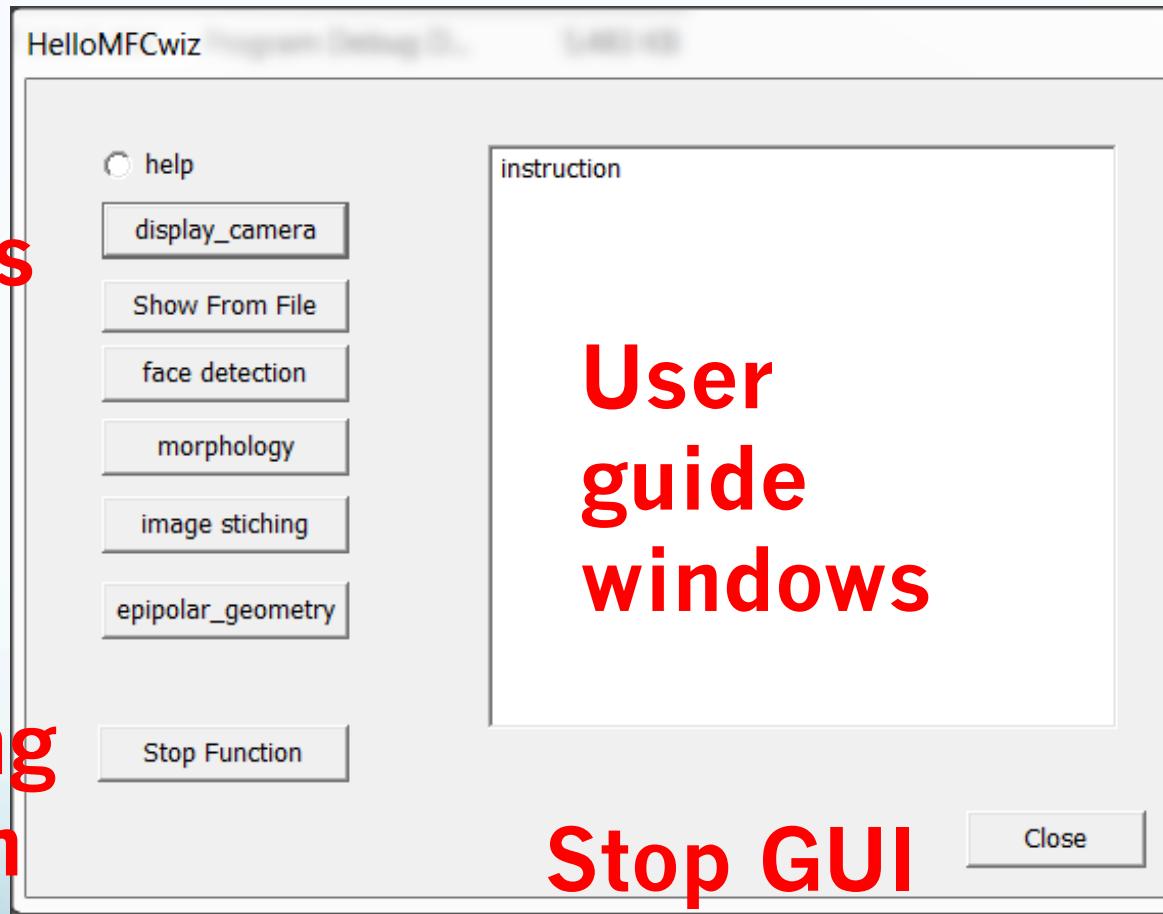
The OcamCalib Toolbox for Matlab allows the user (also inexpert users) to calibrate any central omnidirectional camera, that is, any panoramic camera at a single effective viewpoint (see section 17). The Toolbox implements the procedure initially described in the paper [1] and later extended in [2] and [3]. A detailed introduction to this model is in section 19 of this Tutorial. Furthermore, you can also see a demo of how the toolbox works [here](#).

The Toolbox permits the user to easily and quickly calibrate the omnidirectional camera through two steps. First, it requires the user collect a few pictures of a checkerboard shown at different positions and orientations. Then, the user is asked to extract the corner points. With the new version of the toolbox this operation is done completely automatically. Therefore, no manual extraction is needed. After these two steps, the calibration is completely automatically performed.

**DEMO MATLAB
GUI**

OpenCV GUI

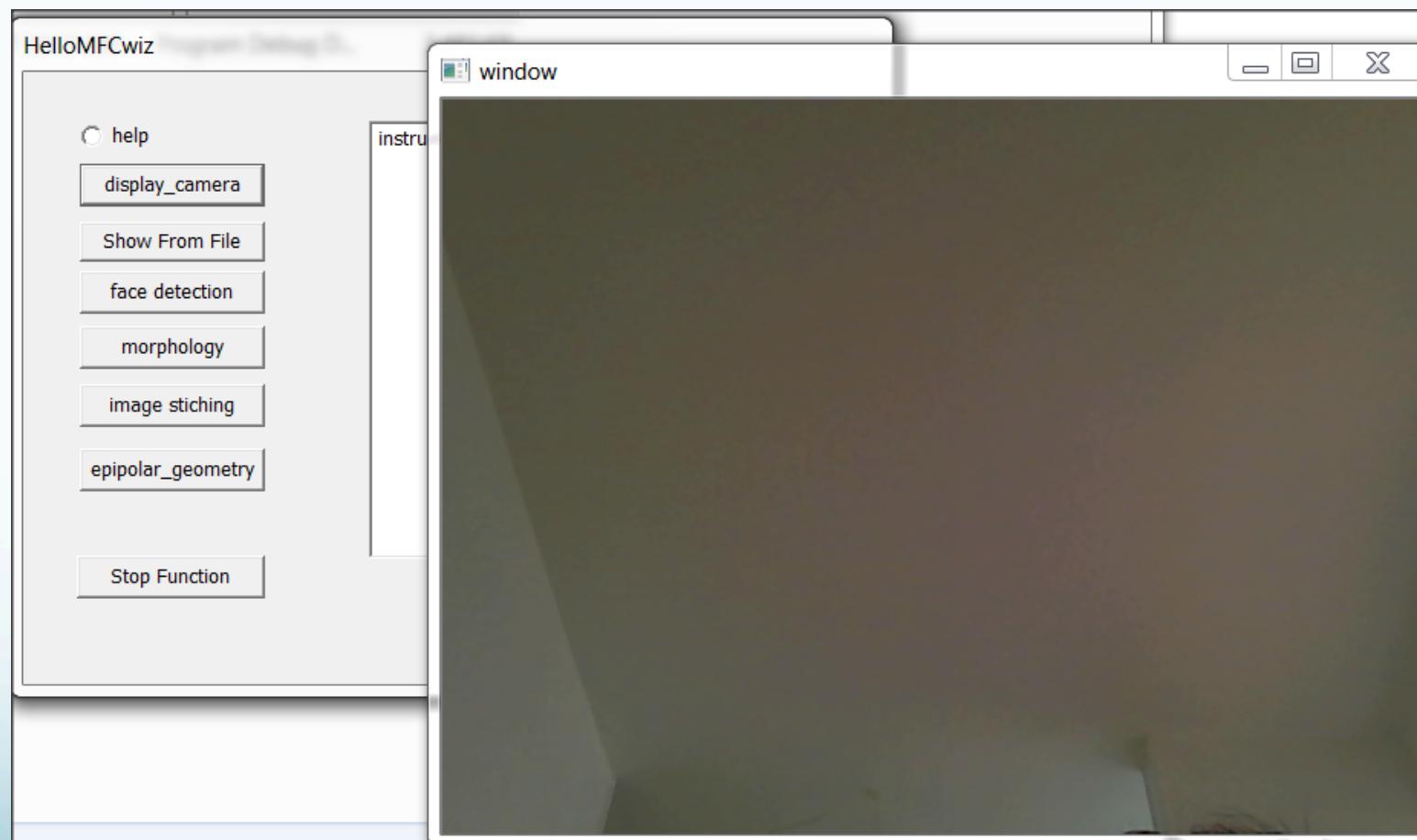
functions



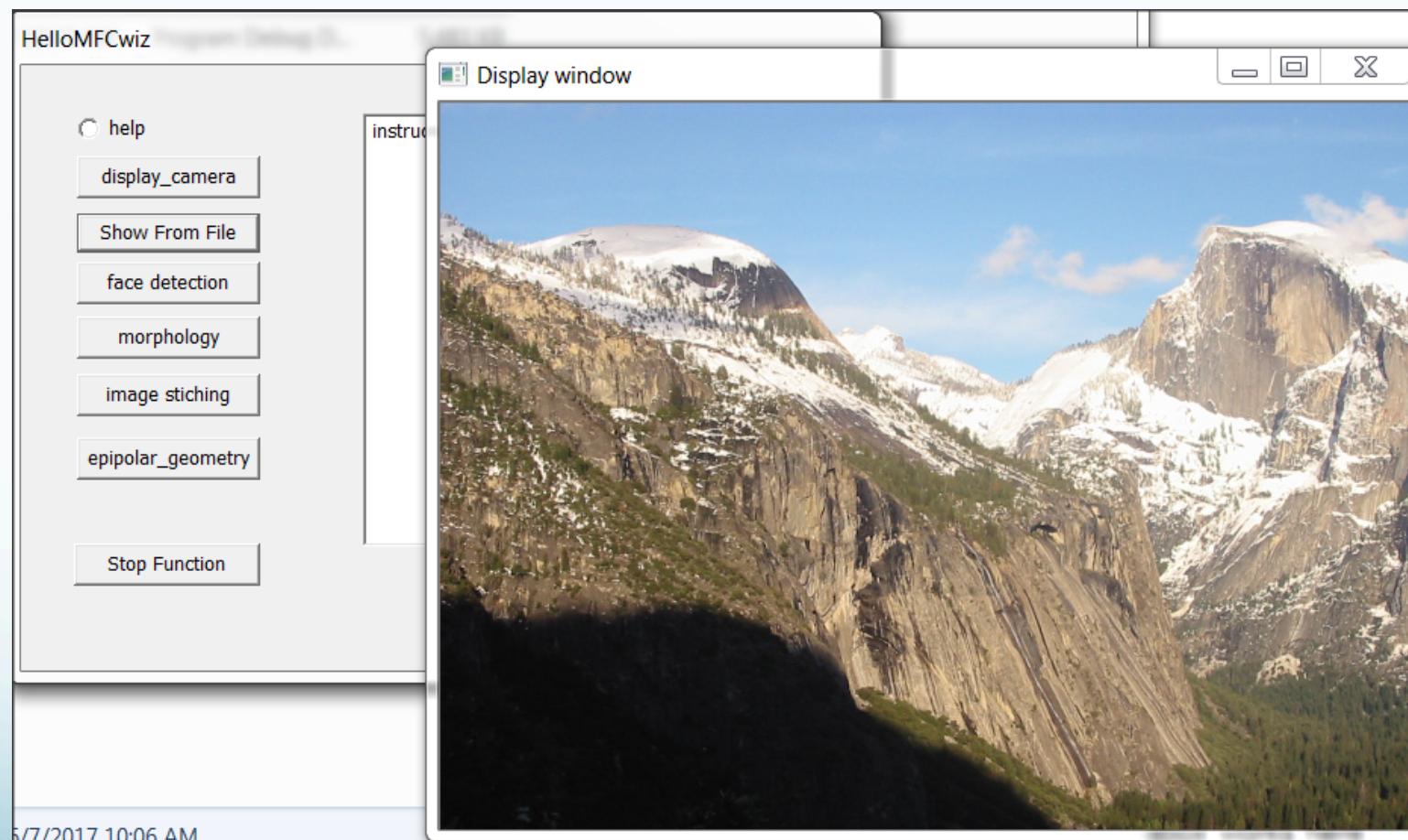
Stopping
function

Stop GUI

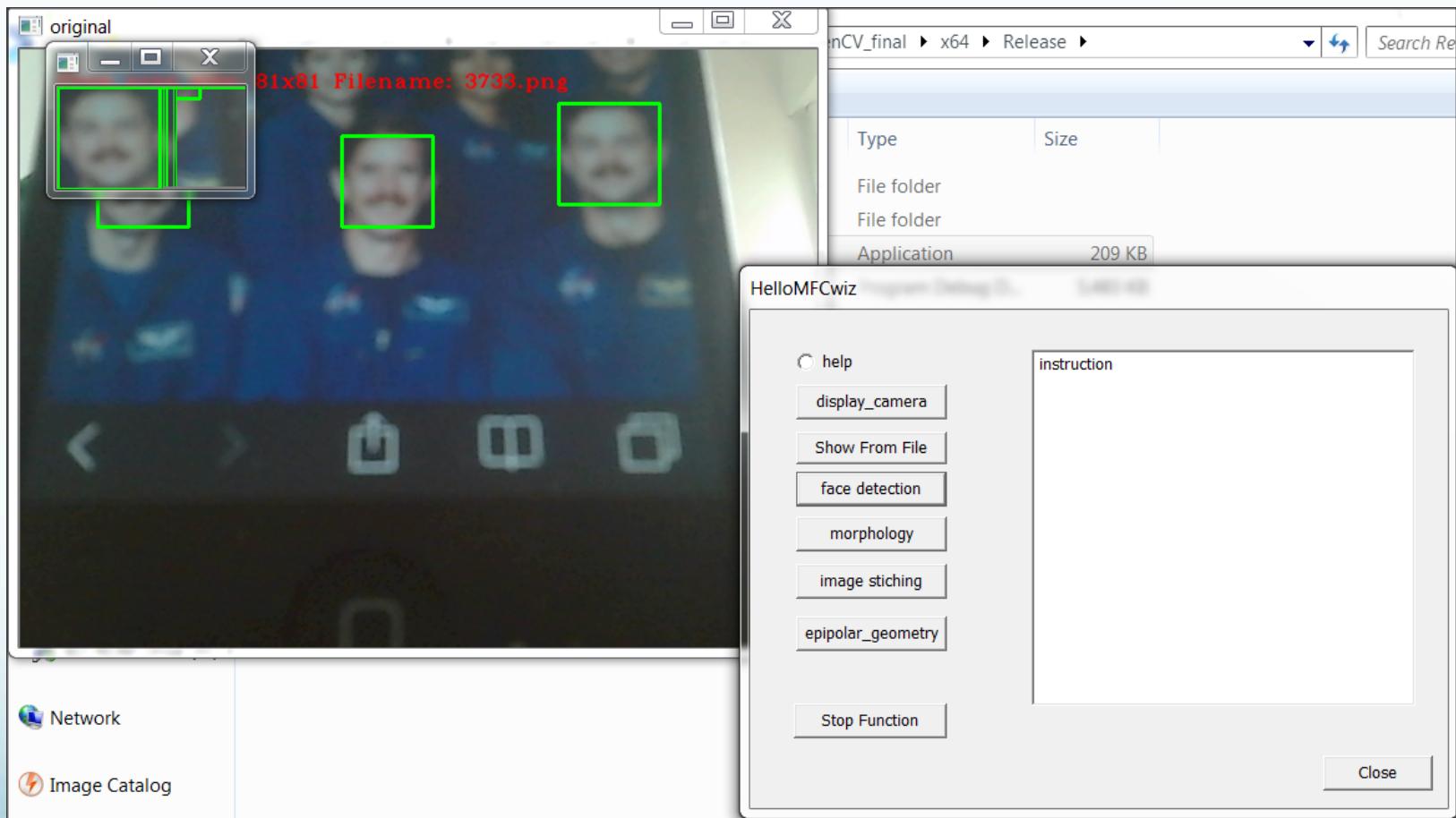
Open camera and display image



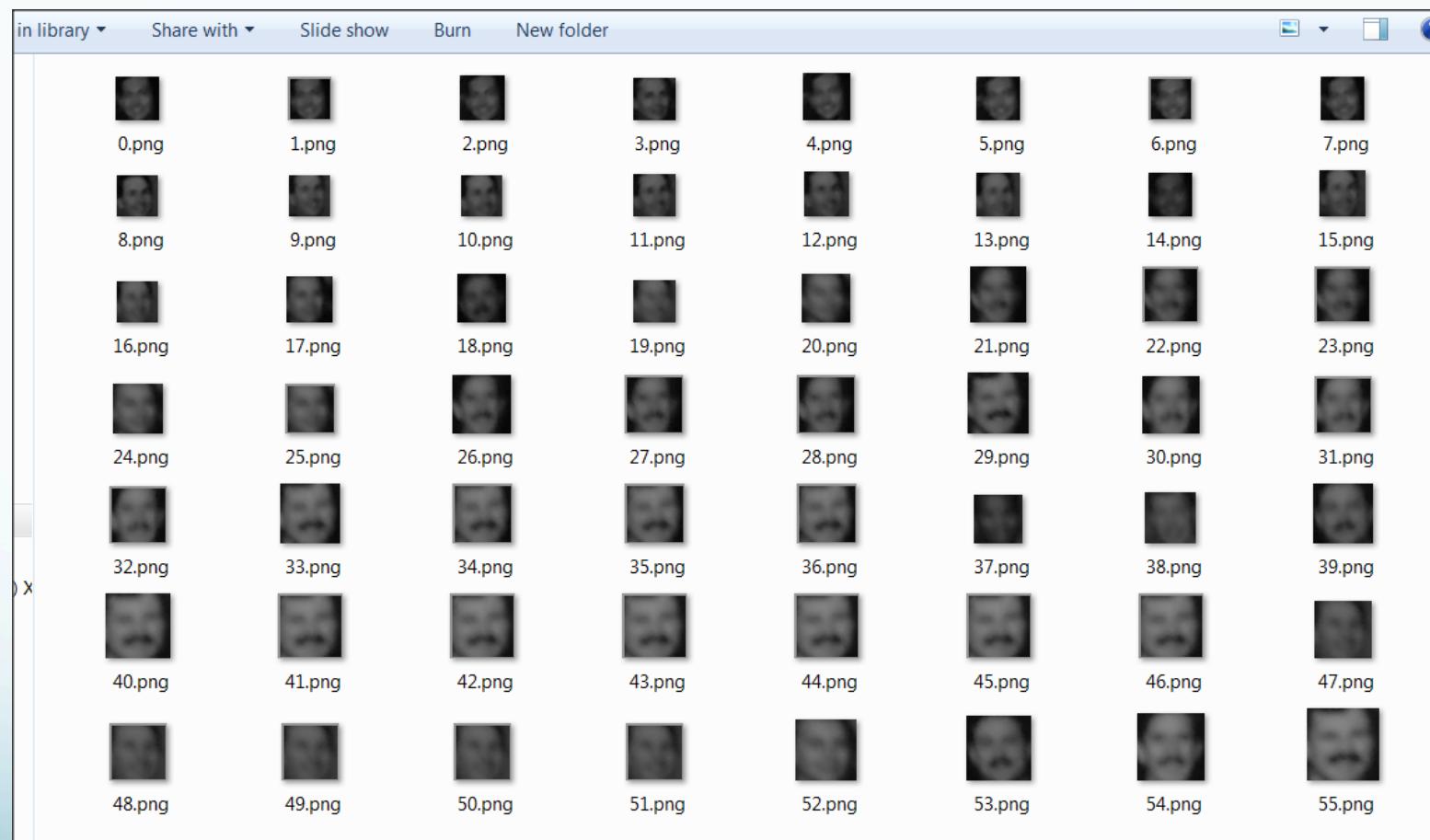
Load image from file



Face detection



Detected faces



The detected faces are stored in folder called “faces”

Morphological operator

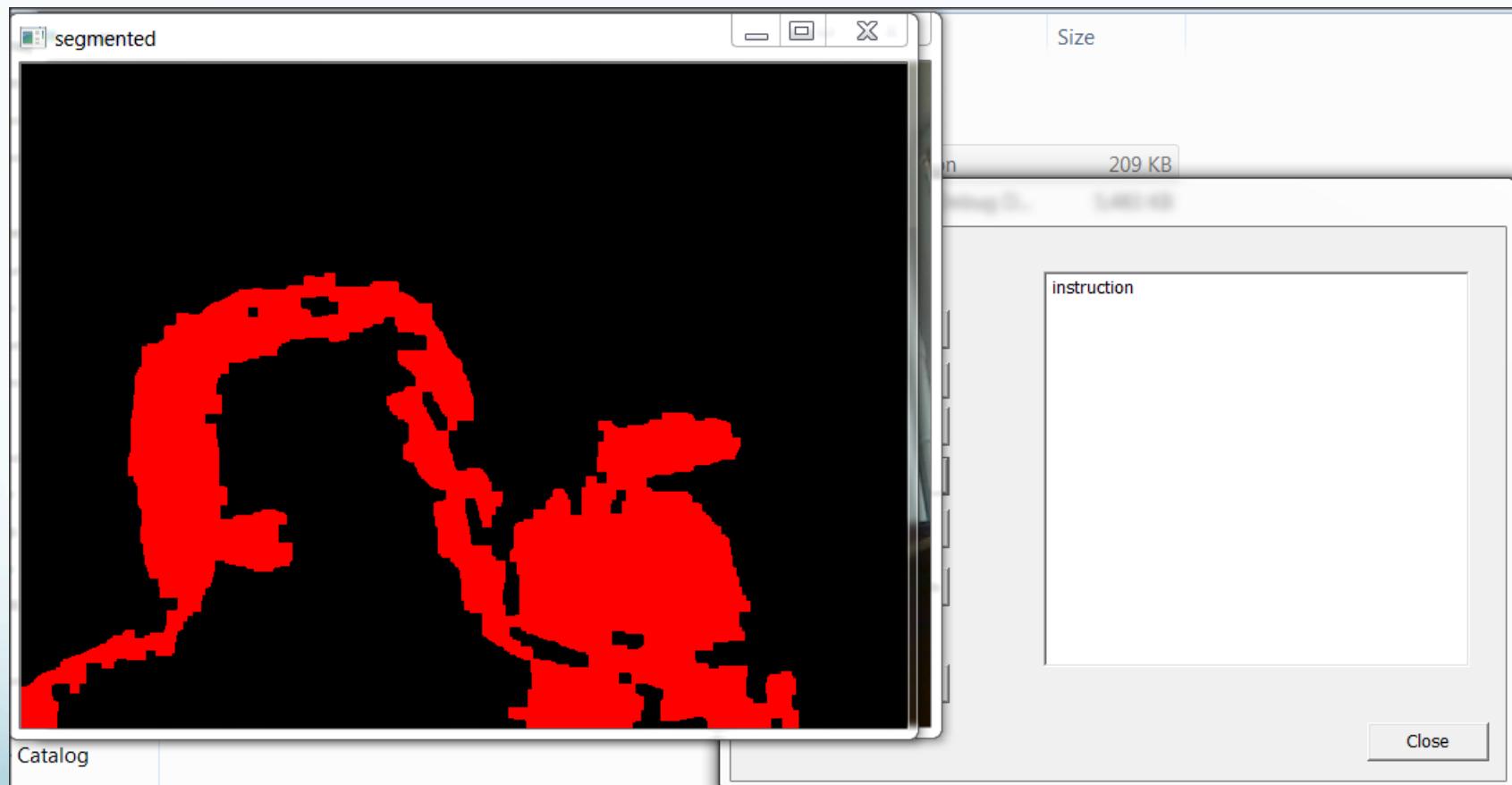
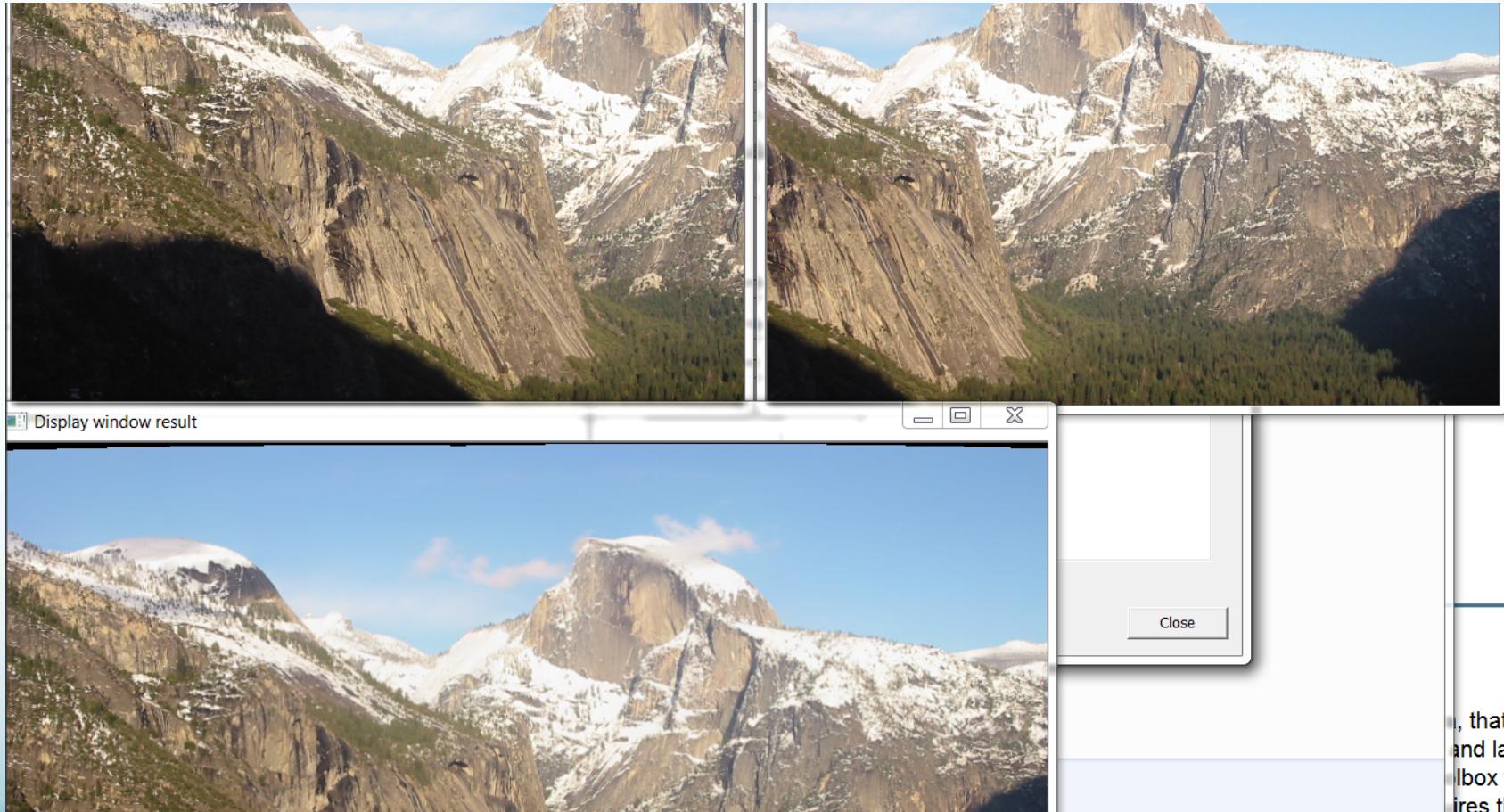
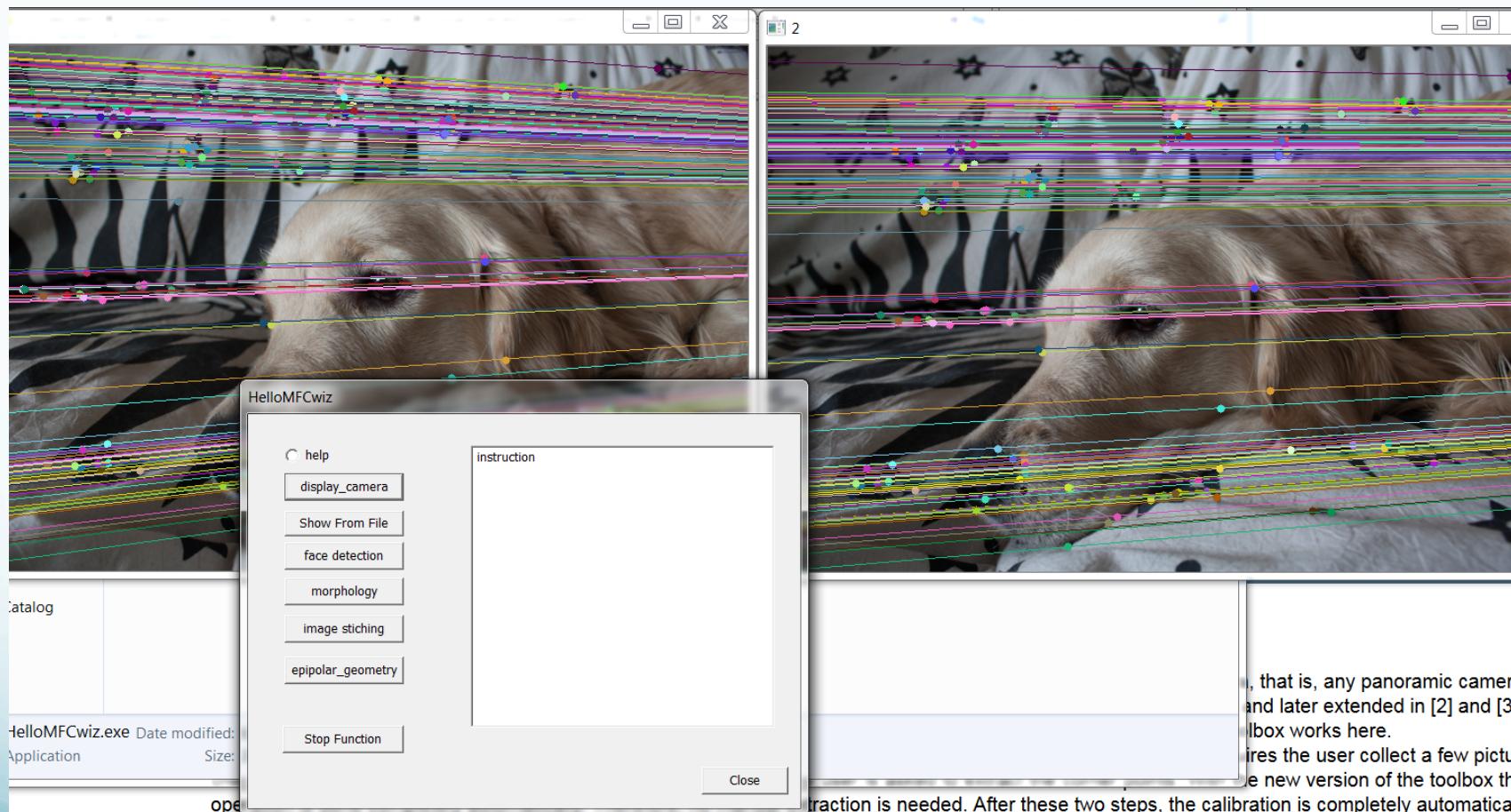


Image stitching



Epipolar geometry and results



Epipolar geometry parameters

```
D:\Sepideh\probabilistic_robotics\final_project_part\OpenCV_pro1\x64\Release\OpenCV_pro1.exe

Primera aproximaci n de z = 0.498998 con derivada = 2897.18
Aproximaci n mejorada de z = 0.111077 con derivada = 0

EQ18 [-3.552713678800501e-015]
EQ19 [8.881784197001252e-016]
EQ18 [0]
EQ19 [0]

H = [0.6974764275846307, -0.0239450744503622, 12.76272491025593;
-0.07812263401412425, 0.8625651952768969, 62.49810786868428;
-0.000378599719457198, 4.205373975851102e-005, 1]
Hp = [0.833493335301795, -0.0273720750687249, 14.58931636810303;
-0.02474612200973136, 0.9170058525174042, 22.27392768859863;
-0.0001992010735962117, 9.383695520828112e-006, 1]

Epipolo antes: [2660.02, 168.463, 1]
Epipolo despues: [0.999181, -0.0404663, -0.000108136]
```

OpenCV Demo