CVToolbox in Matlab

Master in Computer Vision

Visual Perception

Alberto QUINTERO DELGADO
ajquinterod@gmail.com

User Guide

How to open the system

In order to open the system first, the Matlab should be opened and the path to the project should be added or move to the project directory. After that just typing “cvtoolbox” in the Matlab console would launch the application.

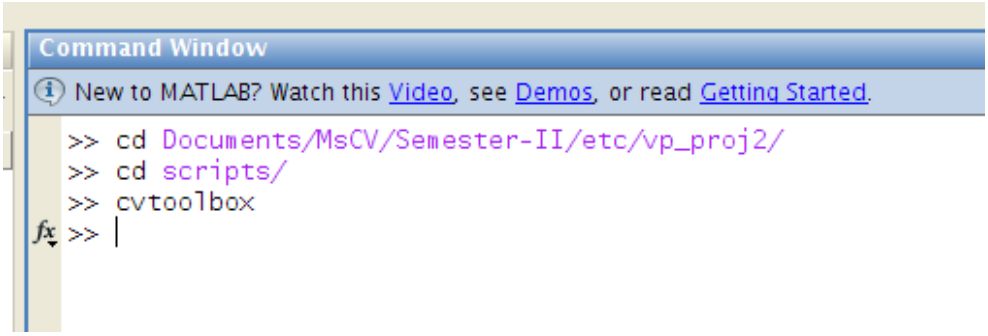


Illustration 1: Opening CVToolbox

Understanding the user interface

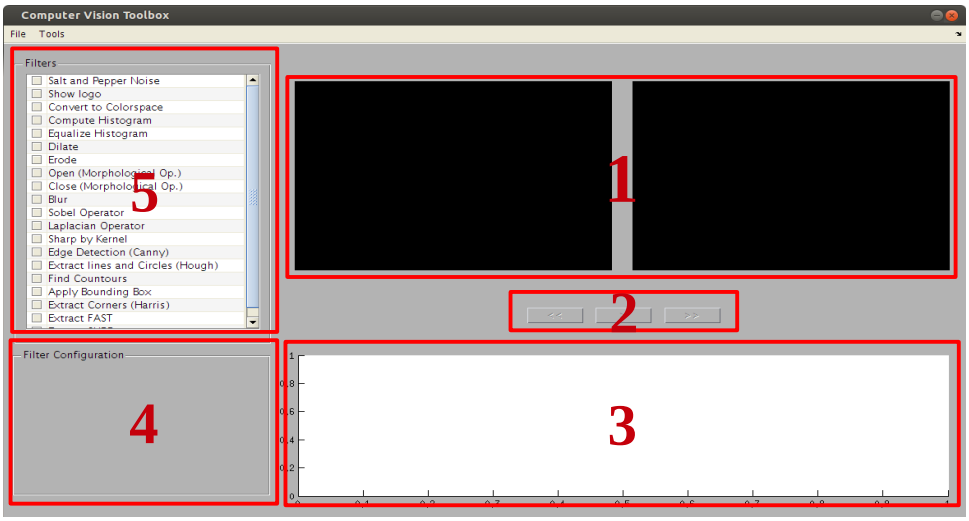


Illustration 2: CVToolbox User interface

In the Fig. 2 the user interface is shown. In the part 1, two frames can been seen, the left one is the input frame, that is, the frame that shows the image as it is, without any modification. In the frame of the right side the output image is shown, that is, the image with all the filters applied.

The part 2 of the interface is just the playback buttons group. Those are used to browse trough the images loaded (when a folder is loaded) or to play or pause the video or the webcam streaming.

The 3rd part is a frame to display the histogram of the image (or the equalized histogram). The toolbox has a frame just for this so it can be shown while displaying the original input image and also the processed output image.

In the part number 5 a list of all the available filters is displayed. Checking on checkbox of a particular filter will activate this filter and apply it to the processed image. And finally in the 4th part of the interface is an area with the aim of displaying the particular configuration parameters for each of the filters as shown in Fig 3.

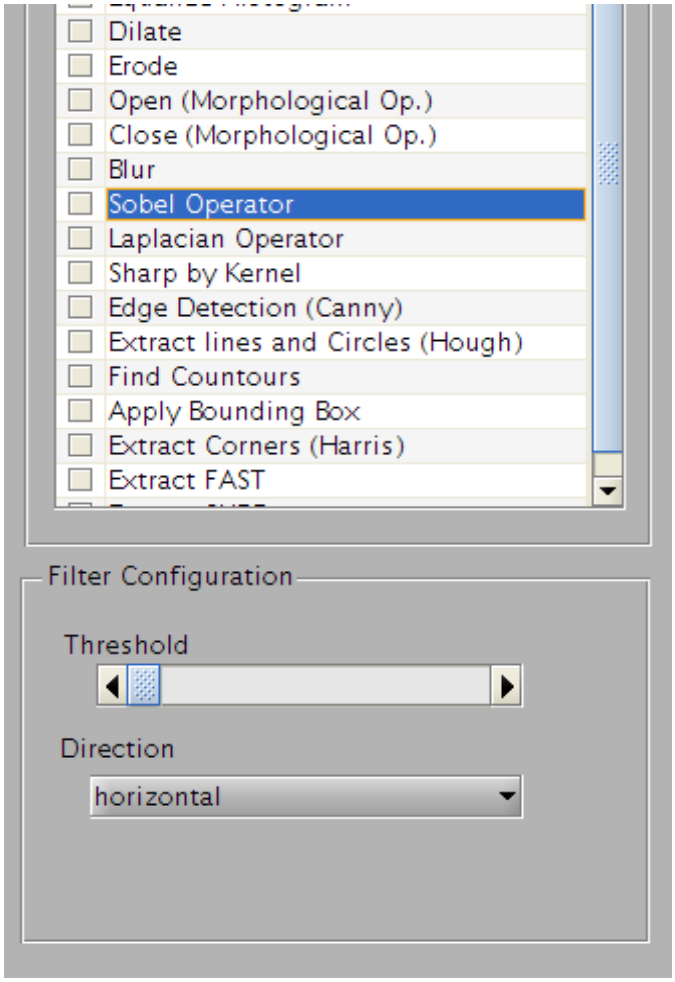
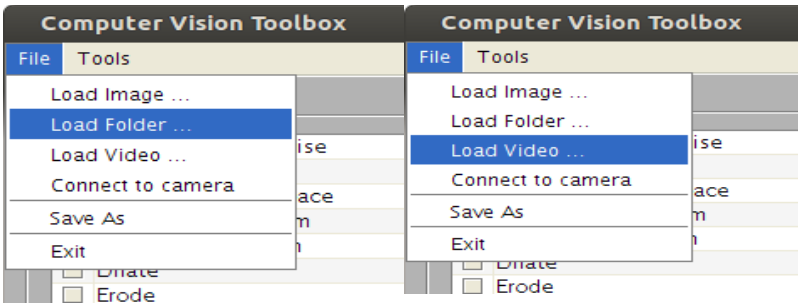


Illustration 3: Configuration parameters for filter

Loading images or video to work with

As it can been seen in the next couple of images, the there is an option in the File menu to load a folder or loading a video. If a folder is going to be loaded this must contain at least one image file supported by Matlab.



Connecting to a webcam

The procedure to connecting to a wecam is the same as loading a folder or a video. Going to the File menu and there clicking in the option “Connect to camera”.

Processing images loaded from a folder

After a folder containing images is loaded several filters can be applied to the image shown. For instance if one wants to apply the ***Sobel Operator*** (Fig. 3) to the current image all that is needed is to click on that option in the filters list and modify the parameters that are shown in the filter configuration frame; in this case, the threshold and the direction (Horizontal, Vertical or both).

The effect of applying the operator on the input image can been immediately seen in the output image (even while modifying its parameters) which is helpful for getting the desire configuration.

Also, using the playback parameters it is possible to browse through all the images in that loaded folder. And if the input image is changed (for the next or previous image in the folder) the previously selected filters remain selected so they are also applied to the new input image.

Real time processing of loaded video or webcam

In this case if a video is being played or a live stream is being obtained from a webcam the effects of applying filters can been seen immediately in the output frame while the video is

still been played. This two modules of the application are non-blocking modules which means that while playing a video or getting the live stream from a camera the application can still been used; selecting filters, changing its parameters, saving the current image processed image in the buffer, etc.

Also while getting the image from a webcam the play button is activated so it is possible to start grabbing images from the camera or pause the streaming.

Saving the resulting image

This CVToolbox is capable of saving the output image showed and for doing so the optioin “Save as ...” is available in the File menu. Clicking in this option would open a File Dialog window in which the user can select the destination (directory) and the filename of the image to be saved.

Opening stereo vision module (SVM)

In order to open the Stereo Vision Module (SVM) it is necessary to click in the option within the Tools menu as is shown in Fig. 4.

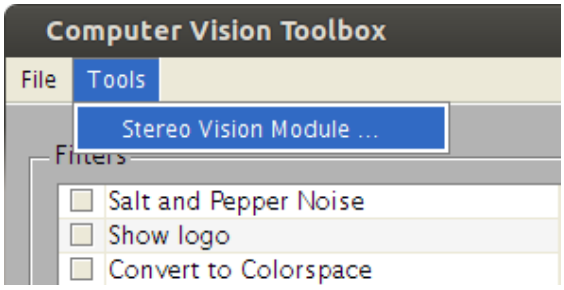


Illustration 4: Opening the SVM

This will allow the user to perform several operations to stereo images. For instance getting the matches, obtaining the fundamental matrix, the homography matrix between the two images, doing mosaicing, etc.

Understanding the user interface of the SVM

Illustration 5: SVM User interface

As It can been seen in Fig. 5 the SVM has three main parts, the first if where the left input image is showed, the second is for showing the right input image and the third one is for displaying the result after doing mosaicing of the two images.

Loading images in SVM

Clicking in the File menu allow the user to see the two options for loading images. As it is showed in Fig. 6 for the left image the procedure for the right image is the same.

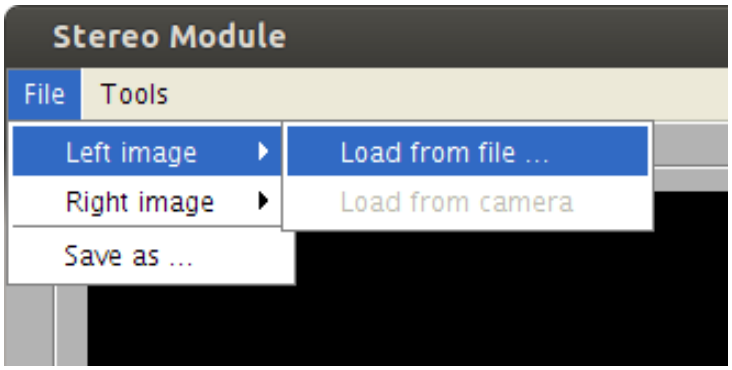


Illustration 6: Loading images in SVM

Operations in SVM

In the SVM there are some specific operations available for the user and all of then can been seen in Fig. 7.

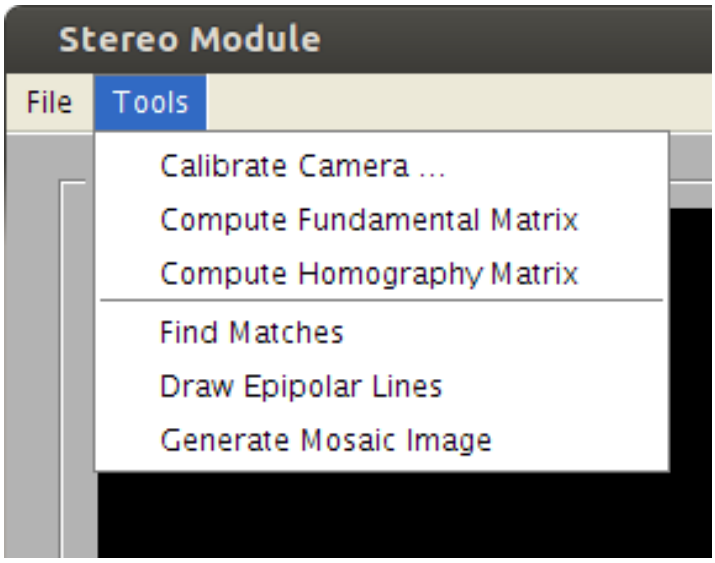


Illustration 7: Tools available in SVM