Visual Perception Coursework

User Manual

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This software is developed as a part of course work for Visual Perception Module of Masters In Computer Vision Program of Centre Universitaire Condorcet, Université de Bourgogne, France. This software is free and open source.

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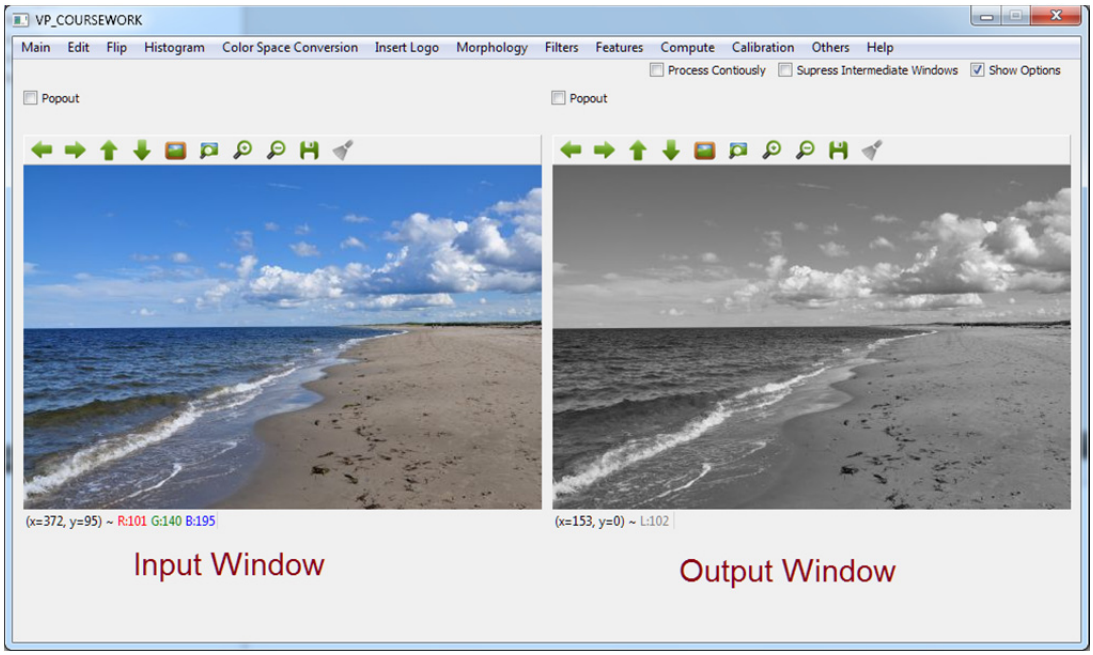
VP COURSEWORK

This is the user manual for VP_COURSEWORK. This software uses open source computer vision libraries (OpenCV) and open source UI framework QT. Some important computer vision algorithms are implemented with user options. The operation of the software is simple. Open Image / video /webcam and start performing the operations.

Main Window

This is main GUI of the software. It consists of input and output windows, main menus and check boxes as shown below:



I) Checkboxes

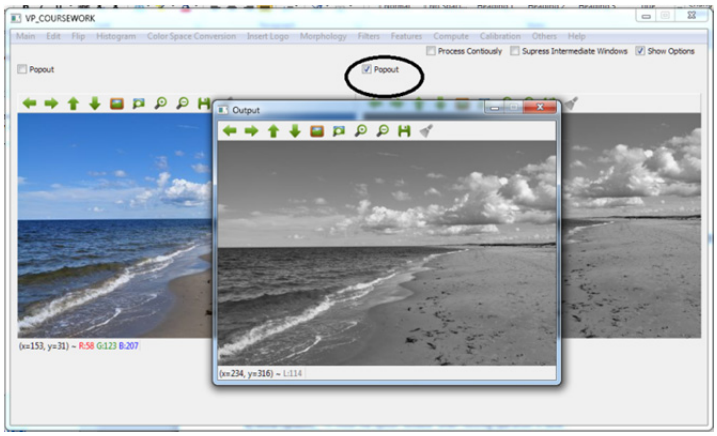
a) Popout:

- When checked, pops out the display window to see image in different scale.

b) Process Continuously

- For simultaneous operations.
- If unchecked, only the current selected operation is applied to the input. If checked, the operations are applied simultaneously in the order of selection.

  For Video and Webcam: - when checked, the operations which are being performed are ticked. If the checked operation is not wanted any more, just click that operation which will uncheck it.



c) Suppress Intermediate Windows

- When checked, suppresses the intermediate windows shown during processing.
- Especially useful when processing videos

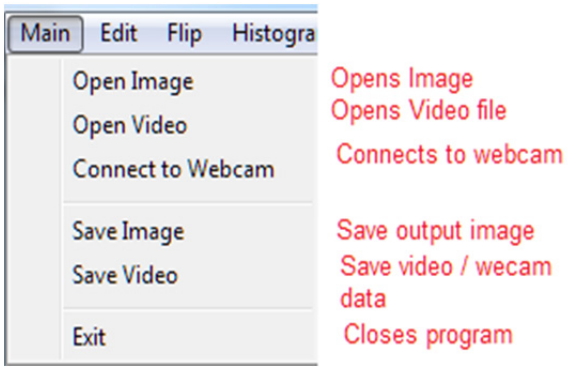
d) Show Options

- To show the option window when resizing operation is done.

II) MainMenu

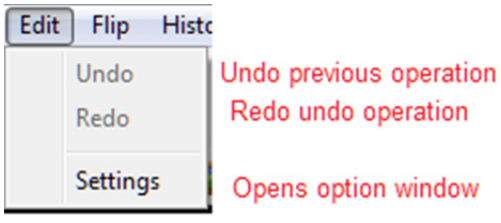
a) Main

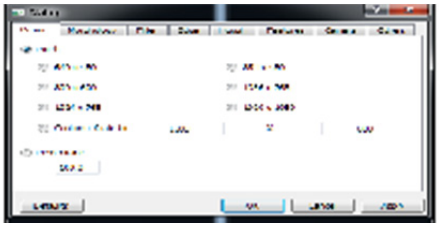
- For opening Image/Video/Webcam and save output.



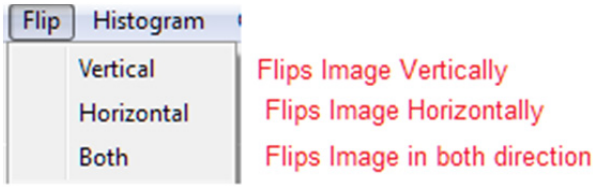
- The webcam selected on OPTIONS window is connected
- To save video file , first open video/webcam and then click save. The video will be saved as the processing is done.
- For webcam <filename>_org is used to save video from webcam
- Saved video file may not be available to other applications until program is closed

b) Edit



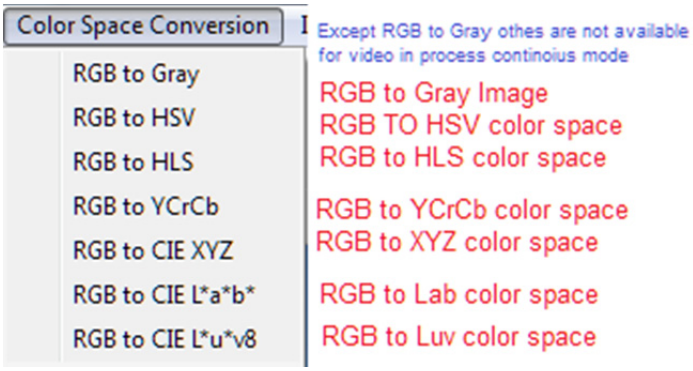


c) Flip



d) Histogram

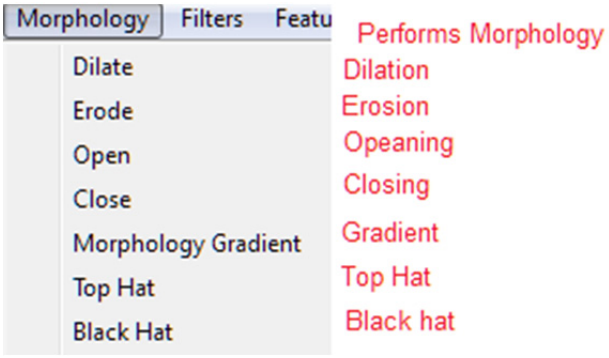
e) Color Space Conversion



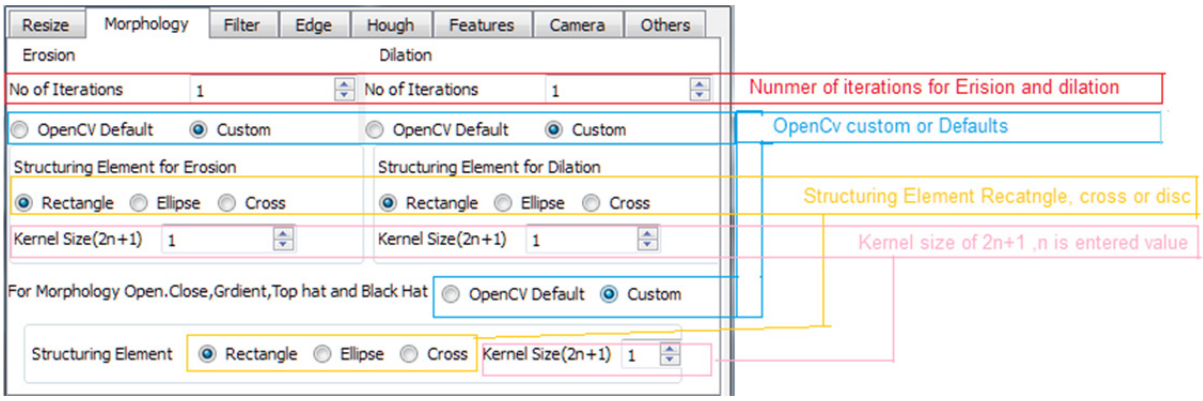
f) Insert Logo

- Inserts Logo.
- Before inserting logo, make sure logo is in bmp format and small enough to fit in the frame.
- Before applying logo, first get logo from Insert Logo -> Get Logo.

g) Morphology

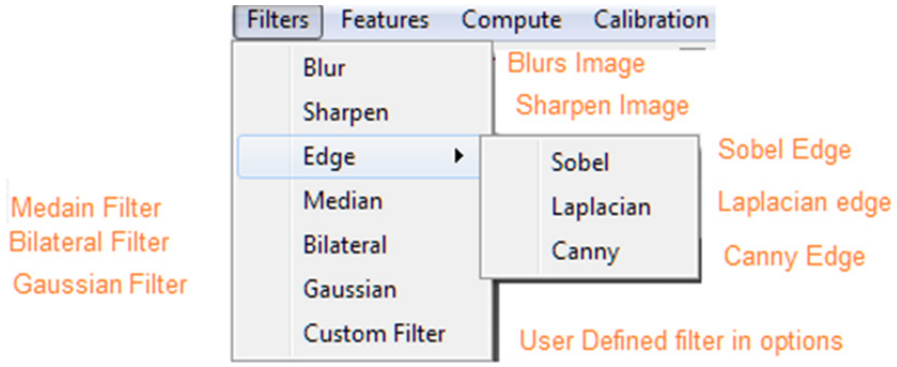


Options

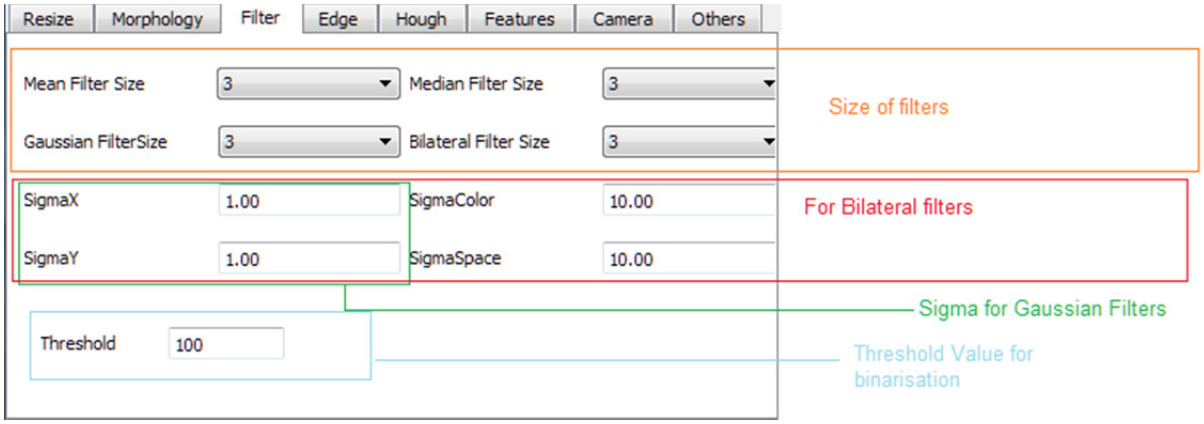


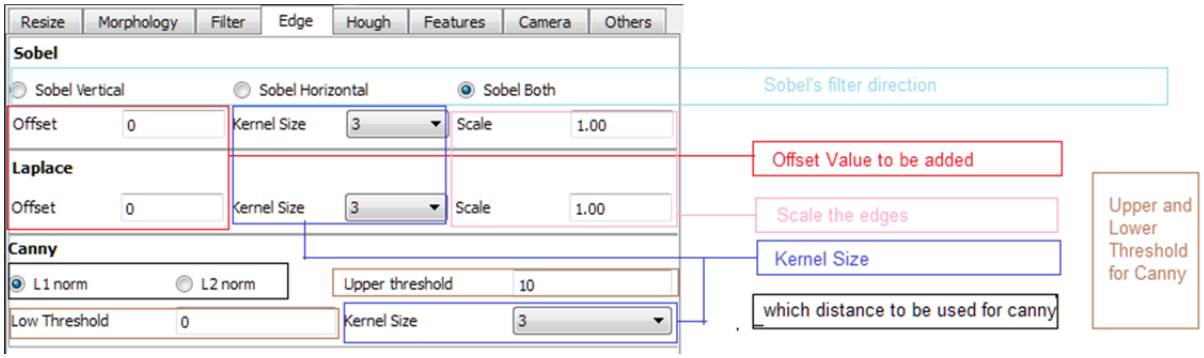
h) Filters

- Performs filtering operation in images
- Before Performing Edge detection Gaussian filter is recommended.
- For webcam data, it is recommended to use median filter to video stream at first.
- Options for custom filter are in *Others* tab.
- Options for Edge filter is in Edge tab.



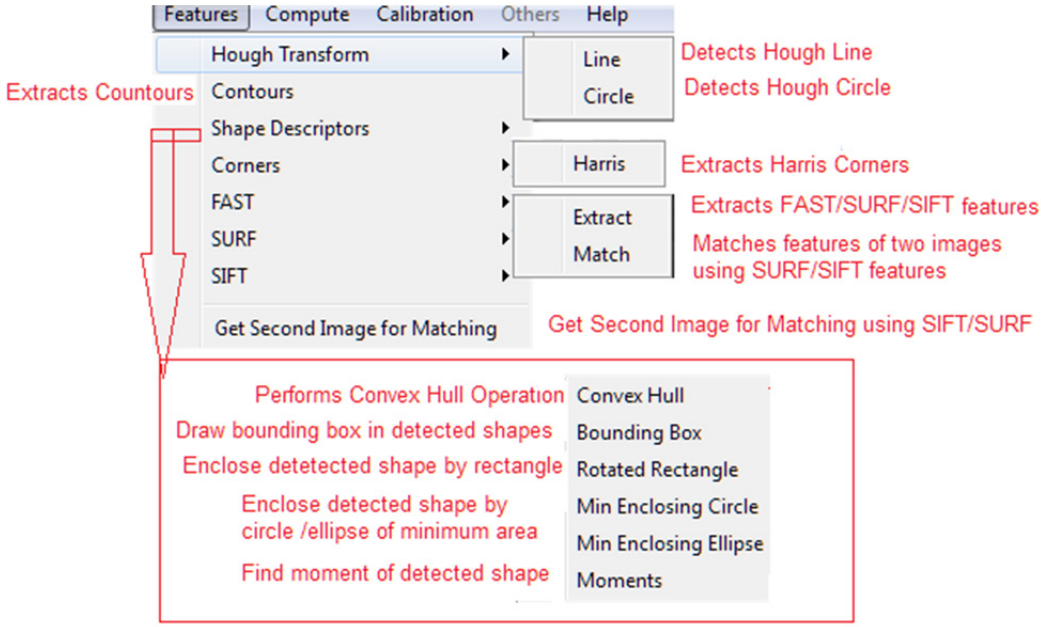
Options



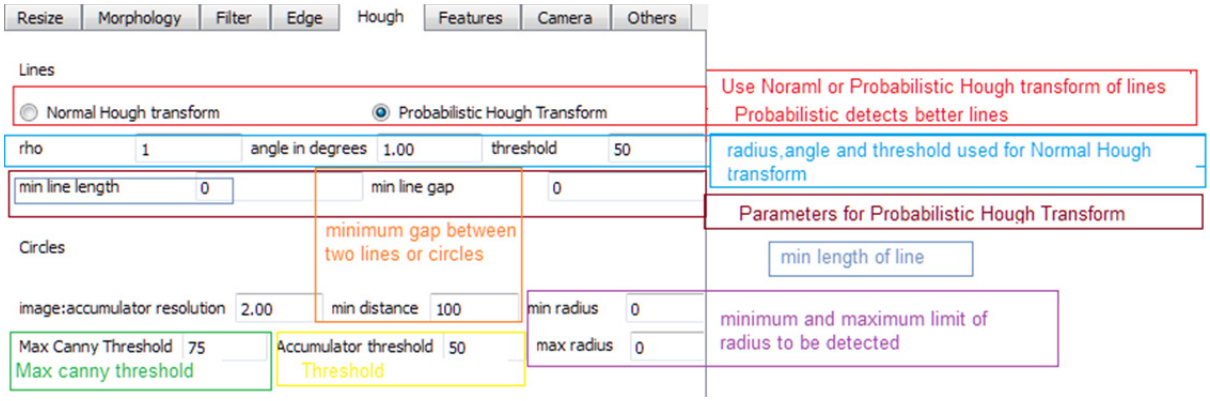


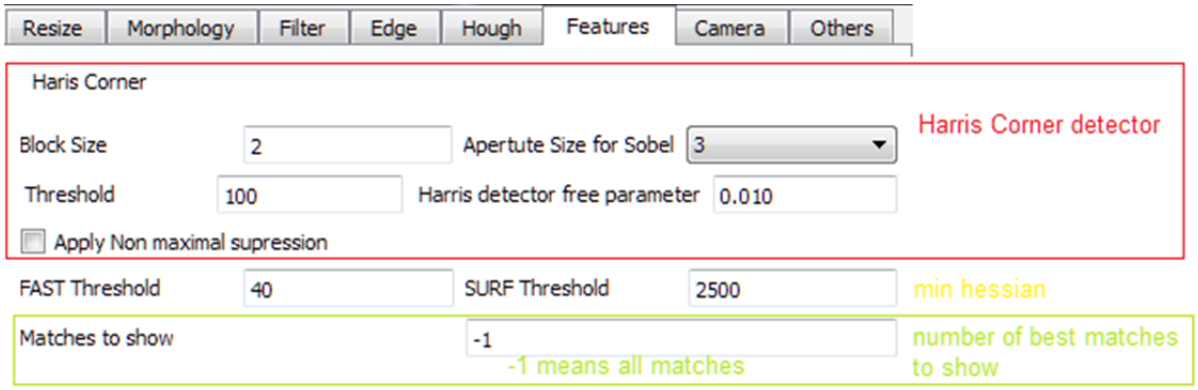
i) Features

- Hough transform, Contours Extraction and Shape Descriptors works better with binary images or images after edge detection



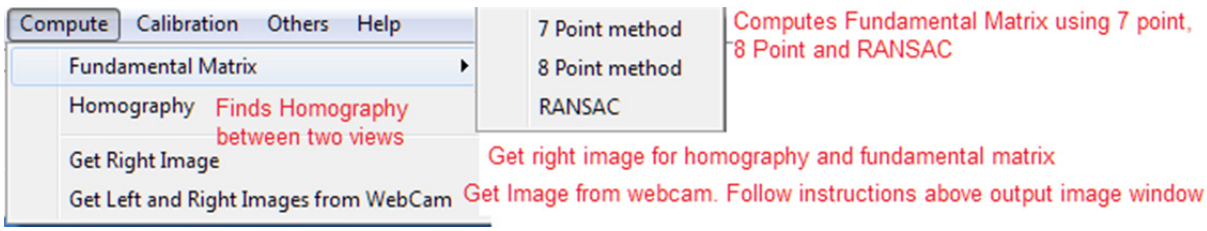
Options





j) Compute

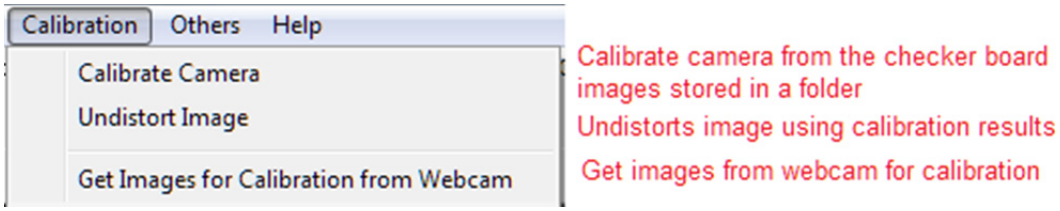
- The left image is assumed to be opened from *Main -> Open Image*
- The images can be taken from Webcam using *Get Left and Right Images from WebCam*
- *Fundamental* and Homograpy matrix are shown in GUI similar to calibration matrix as shown in Appendix.
- After Fundamental matrix calculation, epipolar lines are drawn in image as shown in Appendix



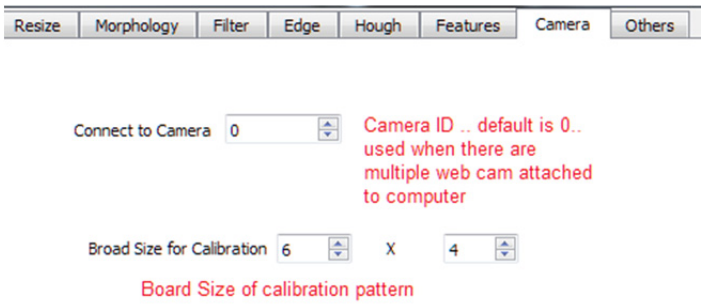
k) Calibration

- Works only for checker board images.

- Images should be in a folder
- Images can be taken from webcam using Get Images for Calibration from *Webcam.* After taking images *Calibrate Camera* should be run.
- Calibration matrix is saved in text file of calibration folder *as* ***calibrationmatrix.txt***
- For Un-distort Image, image should be opened from *Main* menu.
- Calibration matrix is also shown in GUI. Refer to Appendix for this

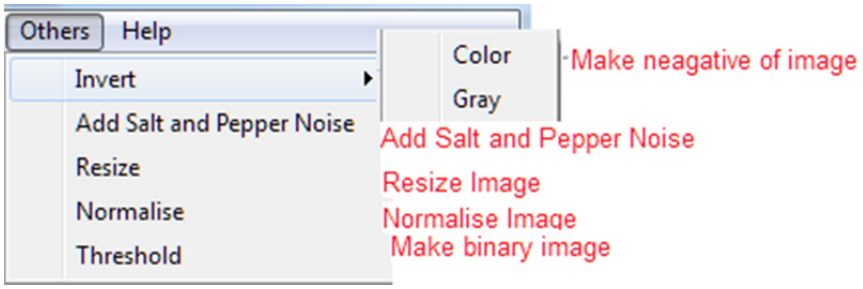


Options

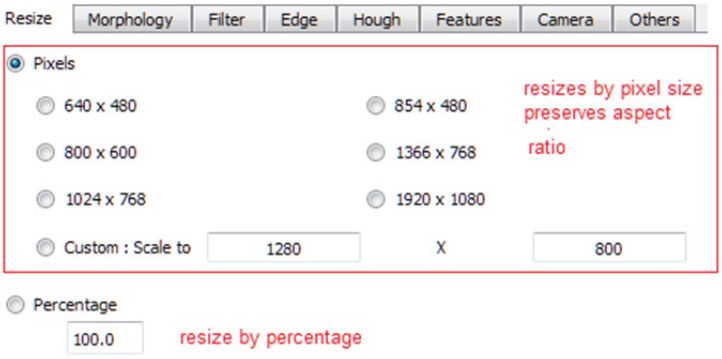


l) Others

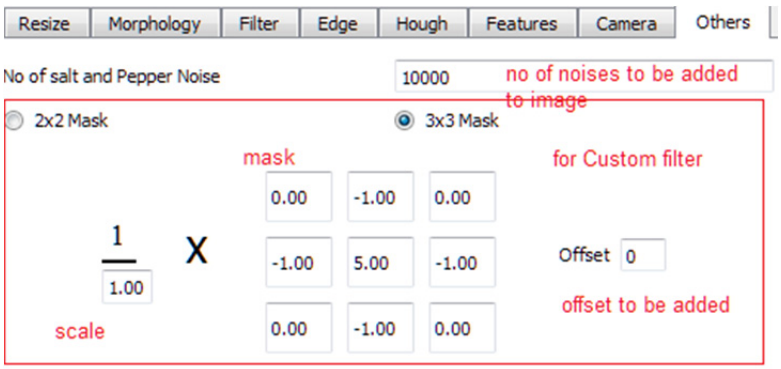
- For miscellaneous operations like adding noise, binarization, normalization, inverting and resizing.
- The options for Thresholding (Binarization) is under *Filter* tab



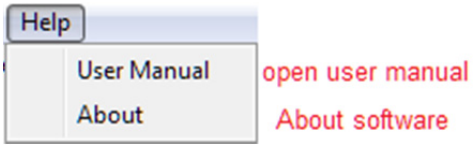
Options



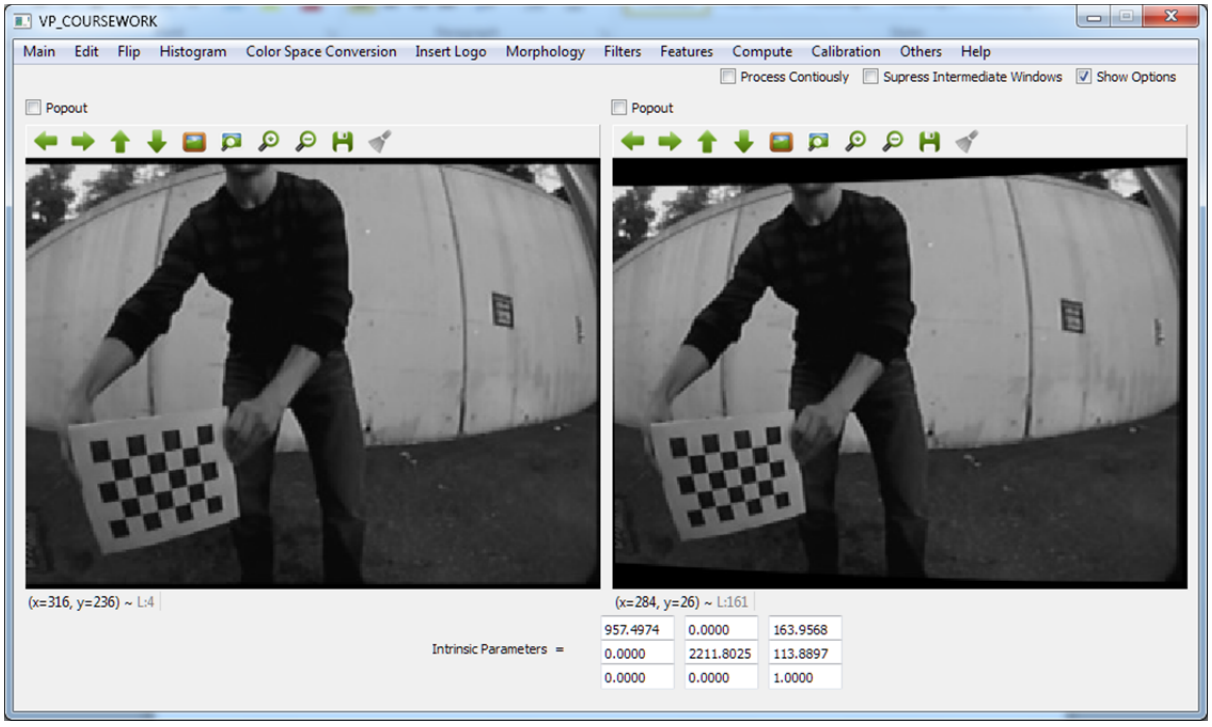
- Resize Options is shown each time the resize operation is called. To disable it uncheck *show options* checkbox.



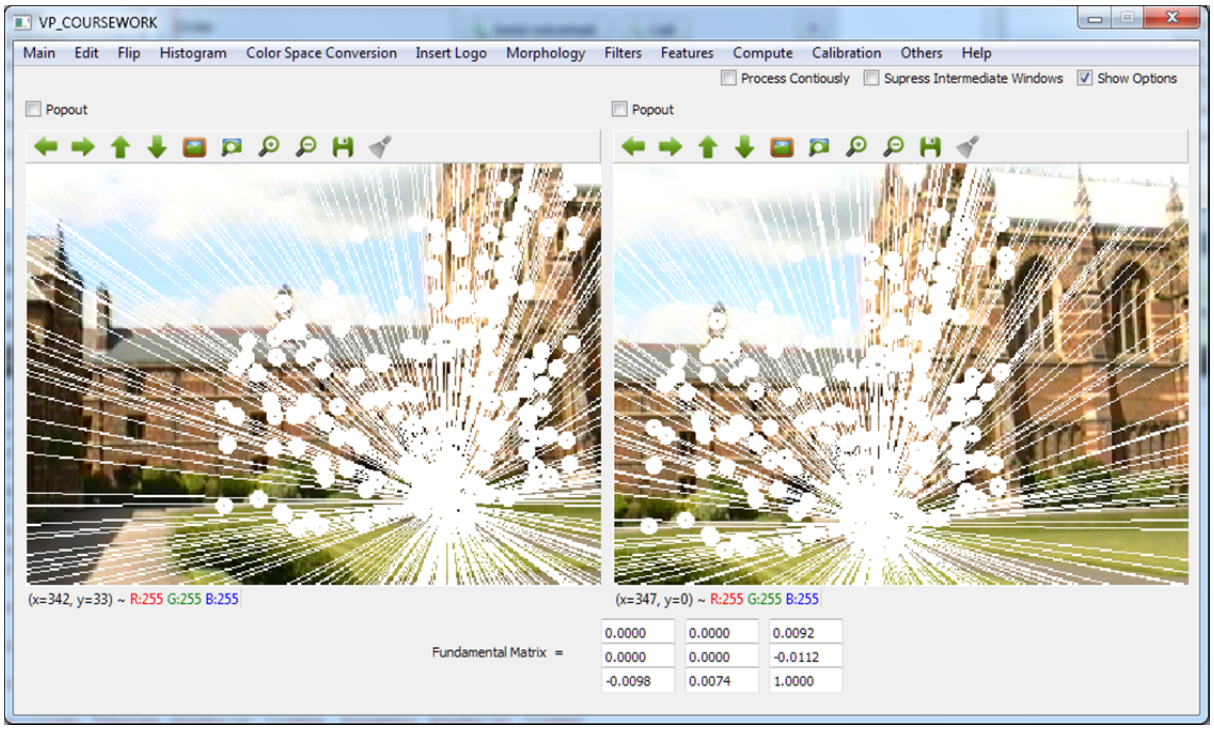
m) Help



Appendix



- Output of camera calibration. The last image taken during calibration is undistorted and shown. The matrix is shown below the windows.



- Fundamental matrix calculation and epipolar lines are shown

Links

1. http://opencv.willowgarage.com/wiki/
2. http://docs.opencv.org/
3. http://qt.nokia.com/products/
4. http://doc.qt.nokia.com/sdk-1.2/index.html
5. OpenCV 2 Computer Vision Application Programming Cookbook by Robert Laganière http://www.packtpub.com/opencv-2-computer-vision-application-programming-cookbook/book
6. http://code.google.com/p/vibot6-mscv3-se/
7. http://code.google.com/p/qt-opencv-multithreaded/

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