**Ellipse Detection**

Startup file for ellipse detection code is ellipseDetector.m. A sample command to call this main program is:

*ellipseDetector('Data\Si12\_0002.tif',1,3,'Results\Si12\_0002')*

Provided a folder all code files required. In this folder, there will be two subfolders named **Data** and **Results**. Data folder contains the input image files. Results folder contains separate folders which will store detection-results of images.

ellipseDetector code required four parameters:

ellipseDetector(<input\_File> , <fig\_output\_option> , <file\_output\_option> , <result\_folder>)

**<input\_File>** First parameter is path and name of input file on which detection is required.

**<result\_folder>** Last parameter is a resultant folder, in which results of detection will be stored.

**<fig\_output\_option>, <file\_output\_option>** Outputs of this code can be displayed in matlab figures and disk files. Detail of outputs can be handled up to three levels i.e. minimum output, normal output and detailed output. We can specify numeric parameters for level of detail in output required.

1 : MINIMAL

2 : NORMAL

3 : FULL

So in example call ellipseDetector('Data\Si12\_0002.tif',1,3,'Results\Si12\_0002'), input file is *Si12\_0002.tif* which is placed in *Data* folder under current folder. *Si12\_0002* is the name of folder which exists in *Results* folder. Both input file and folder to store outputs must exist before execution of program.

Second parameter is 1 which means a minimal output is required in form of figures. Third parameter is 3 which means a detail output is required (showing all stages of ellipse detection) in form of files. Files will be stored in folder specified in fourth parameter.

Note: Commonly used combinations for *second* and *third* parameters are MINIMAL, MINIMAL (1,1) and (MINIMAL, FULL) 1,3. Whereas 1, 1 is fastest. Using FULL (3) for second parameter is slowest as it takes too much memory for open figures.

Details of code in matlab files according to sections in paper are given below:

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| **Description** | **Section in Paper** | **Matlab file Name** |
| Main / Startup Code file |  | ellipseDetector.m |
| Gap Filling / Preprocessing | Section 2.1 | preprocess.m |
| Find Connected Regions | Section 2.2 | growRegions.m |
| IED (incremental Ellipse Detection) | Section 2.3 | workOnRegions.m |
| Calculate values for ellipse evaluation measures | Section 3.1 | evaluateEllipse.m |
| Assign rank to ellipses | Section 3.2 | rankEllipses.m |
| Remove false detections | Section 4 | removeOutliers.m |
| Find more ellipses using Family constraint | Section 5 | findMore.m |
| Merge result of IED and family to remove duplicates | Section 5 | MergeResult.m |