```
multiscale::analysis
                               ::Detector
                 # avgClusterednessDegree
                 # avgDensity
                 # image
                 # outputFilepath
                 # debugMode
                 # outputImage
                 # detectMethodCalled
                 # detectorSpecificFieldsInitialised
                 #OUTPUT CLUSTEREDNESS
                 # OUTPUT_DENSITY
                 # ERR_OUTPUT_WITHOUT
                 DETECT
                 # ERR_OUTPUT_FILE
                 # ERR_INVALID_IMAGE
                 #CSV EXTENSION
                 # IMG_EXTENSION
                 # XML_EXTENSION
                 # WIN_OUTPUT_IMAGE
                 # KEY_ESC
                 # KEY_SAVE
                 #LABEL ATTRIBUTE
                 # LABEL_COMMENT
                 # LABEL_COMMENT_CONTENTS
                 # LABEL_EXPERIMENT_TIMEPOINT
                  NUMERIC_STATE_VARIABLE
                 # LABEL EXPERIMENT TIMEPOINT
                  SPATIAL ENTITY
                 # LABEL_EXPERIMENT_TIMEPOINT
                 NUMERIC STATE VARIABLE NAME
                 # LABEL_EXPERIMENT_TIMEPOINT
                 _NUMERIC_STATE_VARIABLE_VALUE
                 # LABEL_SPATIAL_ENTITY
                  PSEUDO 3D
                 # LABEL_SPATIAL_ENTITY_TYPE
                 # LABEL_SPATIAL_ENTITY
                  CLUSTEREDNESS
                 # LABEL_SPATIAL_ENTITY
                  DENSITY
                 #LABEL SPATIAL ENTITY AREA
                 # LABEL_SPATIAL_ENTITY
                  PERIMETER
                 # LABEL_SPATIAL ENTITY
                 _DISTANCE_FROM_ORIGIN
                 # LABEL_SPATIAL_ENTITY
                  ANGLE DEGREES
                 # LABEL_SPATIAL_ENTITY
                  SHAPE
                 # LABEL SPATIAL ENTITY
                  TRIANGLE_MEASURE
                 # LABEL_SPATIAL_ENTITY
                  RECTANGLE MEASURE
                 # LABEL_SPATIAL_ENTITY
                  _CIRCLE_MEASURE
                 # LABEL_SPATIAL_ENTITY
                 CENTROID_X
                 # LABEL_SPATIAL_ENTITY
                  CENTROID Y
                 # LABEL_AVG_CLUSTEREDNESS
                 # LABEL_AVG_DENSITY
                 + Detector()
                 + ~Detector()
                 + detect()
                 + outputResults()
                 # initialise()
                 # initialiseDetectorSpecific
                 FieldsIfNotSet()
                 # setDetectorSpecificFields
                 InitialisationFlag()
                 # initialiseDetectorSpecific
                 Fields()
                 # initialiseImageDependent
                 Fields()
                 # initialiseDetectorSpecific
                 ImageDependentFields()
                 # initialiseImageOrigin()
                 # isValidInputImage()
                 # getDetectorTypeAsString()
                 # detect()
                 # detectInDebugMode()
                 # detectInReleaseMode()
                 # polygonAngle()
                 # polygonAngle()
                 # minAreaRectCentre()
                 # findGoodPointsForAngle()
                 # findGoodIntersectionPoints()
                 # displayResultsInWindow()
                 # outputResultsToFile()
                 # outputResultsToImage()
                 # storeOutputImageOnDisk()
                 # outputResultsToCsvFile()
                 # outputResultsToCsvFile()
                 # outputSpatialEntitiesToCsvFile()
                 # outputAveragedMeasuresTo
                 CsvFile()
                 # outputResultsToXMLFile()
                 # outputResultsToXMLFile()
                 # addSpatialEntitiesToPropertyTree()
                 # addAverageMeasuresToPropertyTree()
                 # addNumericStateVariableTo
                 PropertyTree()
                 # constructPropertyTree()
                 # addSpatialEntityProperties
                 ToTree()
                 # addSpatialEntityTypeToPropertyTree()
                 # getCollectionOfSpatialEntity
                 Pseudo3D()
                 # processImageAndDetect()
                 # clearPreviousDetectionResults()
                 # createTrackbars()
                 # createTrackbarsWindow()
                 # createDetectorSpecificTrackbars()
                 # processPressedKeyRequest()
                 # displayImage()
                 # printOutputErrorMessage()
                                       multiscale::analysis
                                                ::RegionDetector
                                      - alpha

    beta

                                       - blurKernelSize
                                       - morphologicalCloseIterations
                                       - regionAreaThresh
                                       - thresholdValue
                                      - regions
                                      - DETECTOR_TYPE
                                       - TRACKBAR_ALPHA

    TRACKBAR BETA

                                       - TRACKBAR KERNEL
                                       - TRACKBAR_MORPH
                                        TRACKBAR_CANNY
                                       - TRACKBAR EPSILON
                                       - TRACKBAR_REGION_AREA
                                        THRESH
                                      - TRACKBAR THRESHOLD
multiscale::analysis
                                       - USE_CANNY_L2
        ::ClusterDetector
                                       - CONTOUR_AREA_ORIENTED
                                       ALPHA_REAL_MIN
# entityPileupDegree
                                      - ALPHA REAL MAX
# eps
                                       BETA_REAL_MIN
# minPoints
                                       - BETA REAL MAX
# clusters
                                       ALPHA_MAX
- DETECTOR_TYPE
                                       BETA_MAX
- TRACKBAR EPS
                                       KERNEL_MAX
- TRACKBAR_MINPOINTS
                                       MORPH_ITER_MAX

    MIN POINTS MIN

                                       - CANNY_THRESH_MAX
- MIN POINTS MAX
                                      - EPSILON MAX
- EPS_MIN
                                       - REGION_AREA_THRESH_MAX
- EPS MAX
                                        THRESHOLD_MAX
- EPS REAL MIN
                                       - THRESHOLD CLUSTEREDNESS
- EPS_REAL_MAX
                                      - INTENSITY MAX
                                       - POLYGON CLOSED
+ ClusterDetector()
                                       - DISPLAY_LINE_THICKNESS
+ ~ClusterDetector()
+ getEps()
                                      + RegionDetector()
+ getMinPoints()
                                       + ~RegionDetector()
+ getClusters()
                                       + getAlpha()
+ setEps()
                                       + getBeta()
+ setMinPoints()
                                       + getBlurKernelSize()
# initialiseDetectorSpecific
                                       + getEpsilon()
Fields()
                                       + getMorphologicalCloseIterations()
# createDetectorSpecificTrackbars()
                                       + getOriginXCoordinate()
# clearPreviousDetectionResults()
                                       + getOriginYCoordinate()
# getDetectorTypeAsString()
                                       + getRegionAreaThresh()
# processImageAndDetect()
                                       + getThresholdValue()
# detectEntitiesInImage()
                                       + getRegions()
# detectAndAnalyseClusters()
                                       + setAlpha()
# detectClusters()
                                       + setBeta()
# convertEntities()
                                       + setBlurKernelSize()
# convertNonPiledUpEntities()
                                       + setEpsilon()
# convertPiledUpEntities()
                                       + setMorphologicalCloseIterations()
# addEntitiesToClusters()
                                       + setOriginXCoordinate()
# analyseClusters()
                                       + setOriginYCoordinate()
# analyseClustersOriginDependent
                                       + setRegionAreaThresh()
Values()
                                       + setThresholdValue()
# updateClusterOriginDependent

    initialiseDetectorSpecific

Values()
                                       Fields()
# getClusterConvexHull()
                                       - initialiseDetectorSpecific
# computeClusterednessIndex()
                                      ImageDependentFields()
# computeAveragePileUpDegree()
                                       - createDetectorSpecificTrackbars()
# getCollectionOfSpatialEntity
                                       getDetectorTypeAsString()
Pseudo3D()

    processImageAndDetect()

# convertEpsValue()
```

- THRESHOLD\_MAX - ENTITY\_THRESH - DATAPOINT\_WIDTH - DATAPOINT\_THICKNESS

multiscale::analysis

- thresholdedImage

 height - width - entityHeight - entityWidth - THRESHOLD

::SimulationClusterDetector

# getValidMinPointsValue()

- + SimulationClusterDetector() + ~SimulationClusterDetector() initialiseDetectorSpecific ImageDependentFields() initialiseThresholdedImage()
- detectEntitiesInImage() - isEntityAtPosition() getEntityCentrePoint() - getEntityContourPoints()
- computePileUpDegreeAtPosition() - outputResultsToImage()
- outputClusterToImage() - outputClusterShape() - outputClusterTriangularShape() outputClusterRectangular Shape()
  - outputClusterCircularShape()

- changeContrastAndBrightness() smoothImage() - morphologicalClose()

- thresholdImage() - findRegions()

Degree() computeAverageDensity() - findContoursInImage()

- computeAverageMeasures() - computeAverageClusteredness

- createRegionFromPolygon()

- isValidRegion() - regionClusterednessDegree() regionDensity() - regionArea()
- regionHolesArea() clearPreviousDetectionResults()
- getCollectionOfSpatialEntity Pseudo3D() - outputResultsToImage()
- convertAlpha() - convertBeta()