Automatet object boundary tracking function: imEdgeTracker

imEdgeTracker

- Parameter inizialization
- Allocate memory
- image loop
  - Read image
  - Detect the object edge
  - WRITE_PIXEL_EDGE
  - WRITE_MASK_DATA
  - Find spline descriptor for edge
  - WRITE_EDGE_IMG_DATA
  - Get unit normals relative to object edge and band mask
  - Average unit normals
  - WRITE_NORM_DATA
  - Calculate protrusion as initial values for mechanical model
  - Calculate protrusion based on mechanical model
  - Average protrusion vectors in segments
  - WRITE_PROT_DATA
- Post processing

imreadnd2

- Read image
- Normalize image (BIT_DEPTH)

imFindCellEdge

- Filter image (IMG_SIGMA)
- Find global threshold level
- Threshold image
- Median filter (MEDIAN_F)
- Find largest object with size > OBJ_SIZE
- Fill holes in the object
- Close boundary (ERODE_DILATE)
- Fill holes
- Get longest edge
- Sort edge pixels

imPixelChainSpline

- Get smoothing spline description of the edge (TOLERANCE)

prGetProtRegion

- Get unit normals relative to object edge pointing away from edge.
- Get band mask (PROT_DEPTH) along object edge

prGetAvEdge

- Average vectors associated with a spline in segments along the spline

prGetDispNearest

- Calculate protrusion based on nearest distance

prGetDispMech

- Calculate protrusion based on mechanical model (K_S, K_D, K_W, RESIDUAL_LIM)

imFindThreshFilt

- Image histogram (DEPTH)
- Cut lower part of histogram (LOWER_CUT)
- Cut upper part histogram (UPPER_CUT)
- Filter histogram (F_WINDOW, F_SIGMA)
- Find all local maximas and minimas
- Get significant minimas and maximas
- if GAUSS_FIT
  - Fit two Gauss distributions to histogram
  - a) Find minima of combined distribution
  - b) Find intersection of both distributions
  - c) Find point of same area
  - Chose a) b) or c) as optimal threshold level

extr_relevant_max

- Get significant minimas based on a triplewise comparison of max/min (REL_RELEVANCE, TOT_RELEVANCE)

GaussFunDiff

GaussFunMin

AreaFun

GaussEFun

The code producec the following data:
file stands for the image file name processed
stands for the iage number

Data files:

parameters.dat	parameter settings of the current run
av_normal.dat	segment averaged normal vectors
av_prot.dat	segment averaged protrusion vectors
pixel_edge.dat	pixel coordinates of the object edge
s_mask_*file*_#.dat	pixel coordinates of the boundary segments (PROT_DEPTH)

Image files:

mask_cut_*file*_#.tif	BW mask of the object
prot_mask_*file*_#.tif	BW mask of the object edge strip (PROT_DEPTH)
im_edge_*file*_#.tif	original image streched and superimposed with the edge for control

Capital letters: constants
Bold letters: functions