Local label learning (LLL) for multi-atlas based image segmentation

This package contains standalone Executable files (linux) and research source codes of the Local label learning (LLL) for multi-atlas based image segmentation methods, described in following papers:


The source codes were organized by Qiang Zheng based on research codes used in the above papers. For questions, please contact qiang.zheng@uphs.upenn.edu or yong.fan@ieee.org.

Organization of the codes
Functions of the codes are following:

*Step 1-atlas image processing*

Given a group of atlas images:

1. N4 bias correction
2. rigid registration to MNI152 standard space
3. building the bounding box, and cut the atlas images

*Step 2-target image processing*

Given a target image to be segmented:

1. N4 bias correction
2. rigid registration to MNI152 standard space
3. cut the target image using the bounding box
4. atlas selection using the mutual information
5. non-rigid registration to the target image

*Step 3-label fusion*

Given the prepared target image and atlas images

1. feature extraction
2. label fusion

The label fusion methods include:

% % % SegMethodNum=0; mv

% % % SegMethodNum=1; nlp

% % % SegMethodNum=2; clasvm

% % % SegMethodNum=3; rlbp

% % % % SegMethodNum=4; metricLearn

% % % % SegMethodNum=5; clarf
% % % % SegMethodNum=6; mv_ss
% % % % SegMethodNum=7; clarf_ss

Step4-compute segmentation evaluation Metrics
Dice, Jaccard, Precision, Recall, MeanDistance, Hausdorff, Hausdorff95, ASSD, RMSD

Third party software packages are needed:
1. Dicm2nii
2. Nifti_20140122
3. ANTS
   https://github.com/ANTsX/ANTs
4. ITK
   https://itk.org/
5. Liblinear-2.11
   https://www.csie.ntu.edu.tw/~cjlin/liblinear/
6. Metric Learning
7. Random forests
   https://code.google.com/archive/p/randomforest-matlab/