**S-rep Fitting and Statistics**

a) Production and open web distribution of i) software to fit the powerful skeletal object representation called *s-reps* to data on object descriptions from medical image; ii) statistics software to generate probability distributions from s-reps, train and execute classification between 2 classes of s-reps, and do hypothesis testing on geometric differences between 2 classes of s-reps.

b) Classification of schizophrenic vs. normal hippocampi based on shape.

c) Comparisons of statistics on s-reps to statistics on alternative object representations.

d) Development of methods to statistically characterize the shape of an object in the context of neighboring objects.

e) Comparison of an individual’s manual segmentation with those of others, for training.

f) Improving interior point correspondence across a family of s-reps.

g) Producing smooth manual segmentations from sparse slice contours.

**Segmentation**

Segmentation of the prostate from trans-rectal 3D ultrasound, given that prostate’s shape in MRI. This research involves shape spaces on s-rep differences, appearance models based on regional texture, and geometry-to-image match measures based on each voxel’s probability of being inside the object.

**Registration**

a) Fusion of throat tumor image information from endoscopic cines and CT.

b) 3D registration of 2D projection snapshots during respiration with 3D planning images. Applications in radiographs vs. CT of the abdomen and of the lung; in MRI projections vs. MRI in the abdomen.

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