Med notes

Challenges of MIP

file sizes can be massive (e.g. brain scans => multiple Mbs) *per image*

DL in MI analysis

**prob: unlike imagenet (1mill images), usually very few training examples (no images) in MI. -> strats like augmentation/ fine-tune training**

**prob: hand-crafted features (e.g. stuff in a brain MRI) problem-specific/not reusable (even in the same domain, if images change)**

**prob: need a way to deal with diff MI modalities (e.g. PET scan, CT)**

**prob: need to be able to interpret**

DL allows for feature-extraction to be done while learning by the alg itself, and not by human experts (thus non-experts can work in it).

Deep Boltzmann Machines and Stacked Auto Encoders have been used

Prob with DL – reducing overfitting, because no params > no trainin samples (-> ReLu/de-noising/batch norm/dropout)

applications: organ and cell detection, MRI segmentation, Comp-Aided Detection and Diagnosis

MI Classification Technique Survey

feature extraction techniques: statistical pixel level features, shape/texture/relational features

feature selection techniques:

- linear discriminant analysis: “get a linear combination of features which able to give the best

possible separation among different classes of data in the feature space. It can reduce dimensionality space for classification and also give better classification accuracy”

- principle component analysis: “efficient method of dimensionality reduction of a data set with a big number of interrelated variables. However, for data with sparse distribution and noise, PCA method may not provide optimal selection of features “

- GA-optimization

MI fusion (combining 2/more MI modalities together)

process: input - > img registration -> img fusion - > fused img

ANNs often used, but usually in conjunction with other fusion techs e.g. fuzzy ANNs, wavelet-ANNs. Prob: can’t prove their effectivness across diff. Modalities bc their approaches are skewed to x modality