

MICCAI 2017 (some highlights)

Mariano Cabezas

Deep learning is the present (I) - DLMIA / BrainLes

- ▶ DLMIA workshop (proceedings)
 - ▶ Cost functions (Wasserstein)
 - ▶ Cool SIEMENS talk
 - ▶ 4th iSeg(website), 4th WMH (website)

$$GDL = 1 - 2 \frac{\sum_{l=1}^2 w_l \sum_n r_{ln} p_{ln}}{\sum_{l=1}^2 w_l \sum_n r_{ln} + p_{ln}},$$

Deep learning is the present (II) - Curriculum learning (I)

- ▶ From easy samples to harder ones (CASED: Curriculum Adaptive Sampling for Extreme Data Imbalance, A. Jesson et al.)

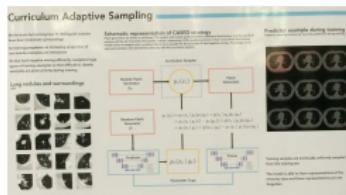


Figure 1: CASED: Curriculum Adaptive Sampling for Extreme Data Imbalance

Deep learning is the present (II) - Curriculum learning (II)

- ▶ Sampling strategies like multi-armed bandit (A Multi-armed Bandit to Smartly Select a Training Set from Big Medical Data, B. Gutierrez et al.)

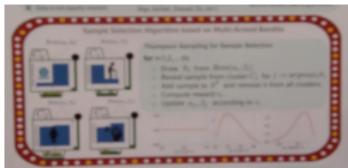


Figure 2: A Multi-armed Bandit to Smartly Select a Training Set from Big Medical Data

Deep learning is the present (III) - Semi-supervised

- ▶ Semi-supervised learning using embedding and multiple metrics
(Semi-Supervised Deep Learning for Fully Convolutional Networks, C. Baur)



Figure 3: Semi-Supervised Deep Learning for Fully Convolutional Networks

- ▶ Adversarial networks for domain adaptation, denoising, unsupervised/semisupervised learning, ... (Kamnitsa's presentation)

Deep learning is the present (IV) - GCNN

- ▶ Convolutional graph stuff
 - ▶ GRAIL 2017 workshop (proceedings, website)

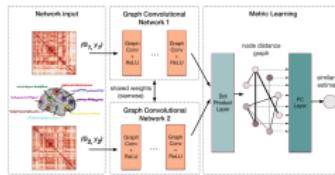


Figure 4: Siamese GCNN

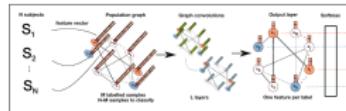


Figure 5: GCNN scheme

Deep learning is the present (V) - Ensembles

► Ensembles of networks

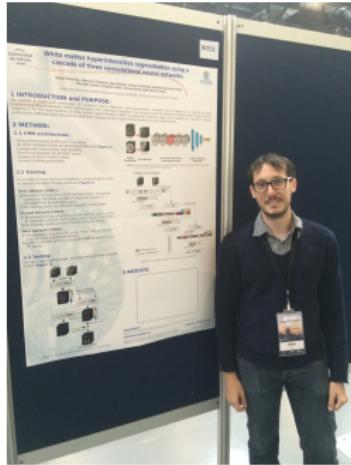
- ▶ Biased subnetwork architectures...
 - ▶ Forget hyperparameters and architectures!
 - ▶ BraTS pre-proceedings are here

Deep learning is the present - Conclusions

- ▶ We should move to TensorFlow
 - ▶ It has a lot of native layers
 - ▶ More versatile for non-convolutional(standard) stuff
- ▶ We should not worry about architectures anymore
 - ▶ Move to new paradigms (adversarials, sampling stuff, ensembles, cost functions, etc.)
 - ▶ Explore uncharted waters!



The really important stuff! (I)



The really important stuff! (II)



Figure 6: Our main food resource. Disgusting and mapley!

The really important stuff! (III)

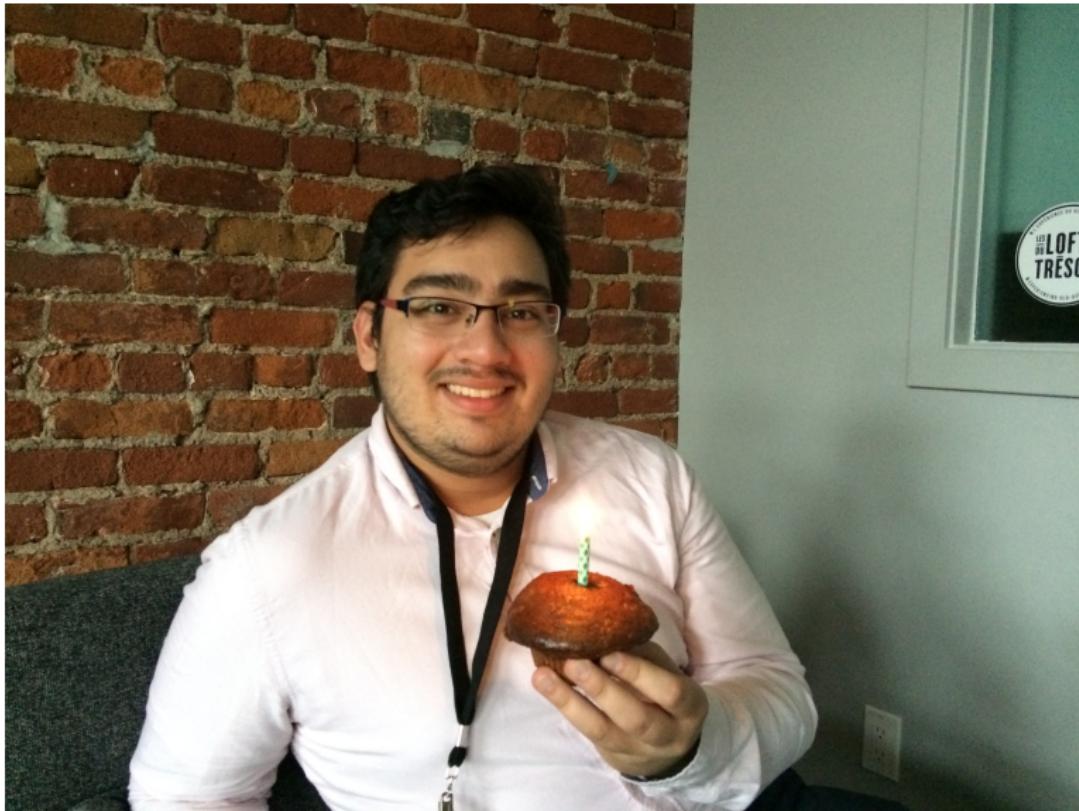


Figure 7: Happy birthday!

The really important stuff! (IV)

- ▶ Yeah, right... Ok...



The really important stuff! (V)



Figure 8: I guess that's it!