Master 2 internship : improving generalization of deep learning segmentation in biomedical applications

Deep learning has become the state-of-the-art approach for the segmentation of biomedical images. In the case of histology, staining is often used to highlight anatomical structures. For biological or technical reasons, staining techniques often produce variable results. Data available at a given moment is therefore not always representative of future acquisitions.

The aim of this internship is to propose different solutions to this problem, such as image augmentation, backpropagation for adaptation [5], image to image translation[2] or generative adversarial networks [1][2][4].

Candidates should be familiar with machine learning and image processing. Experience with Python for programming would be a bonus. The internship could lead to a Ph.D. position.

Duration: 4-6 months, starting between January and March 2019.
Net salary: 1100 € / month.

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References

[1] Sankaranarayanan, Swami, et al. "Generate to adapt: Aligning domains using generative adversarial networks." CVPR 2018.

[2] Motiian, Saeid, et al. "Few-shot adversarial domain adaptation." Advances in Neural Information Processing Systems (NIPS), 2017.

[3] Murez, Zak, et al. "Image to Image Translation for Domain Adaptation." Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition. 2018.

[4] Hosseini-Asl, E., Zhou, Y., Xiong, C., & Socher, R.. Augmented Cyclic Adversarial Learning for Domain Adaptation. ICML 2018

[5] Ganin, Yaroslav, and Victor Lempitsky. "Unsupervised domain adaptation by backpropagation." ICML 2015