

Le prochain séminaire de l'équipe A3SI du LIGM (unité mixte de recherche de l'Université Paris Est) aura lieu le **Jeu**di 30 juin de 13h30 à 14h30, salle 260 ([ESIEE PARIS](#)).

"End-to-end" machine learning of image segmentation (for Connectomics)

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Abstract: Connectomics is a new research effort in neuroscience dedicated to mapping the connectivity of real biological neural networks in the brain. It is still early days and much effort is still dedicated to developing good methods for mapping neural networks. And high-throughput, highly-accurate, automatic image segmentation is the most important technology for the success of connectomics.

In this talk, I will present a new machine learning method for the supervised learning of image segmentation. Supervised machine learning is a powerful tool for creating accurate image segmentation algorithms that are well adapted to any dataset. Such algorithms have three basic components: 1) a parametrized function for producing segmentations from images, 2) an objective function that quantifies the performance of a segmentation algorithm relative to ground truth, and 3) a means of searching the parameter space of the segmentation algorithms for an optimum of the objective function.

I will also present new work in each of these areas: 1) a segmentation algorithm based on convolutional networks as boundary detectors, 2) the Rand index as a measure of segmentation quality, and 3) the MALIS algorithm, based on ultrametric learning, for training boundary detectors to optimize the Rand index segmentation measure. Taken together, these three pieces constitute the first system for truly "end-to-end" learning of image segmentation, where all parameters in the algorithm are adjusted to directly minimize segmentation error.

References:

<http://www.mit.edu/people/sturaga/papers/Jain2010COIN.pdf>

<http://www.mit.edu/people/sturaga/papers/Turaga2009NIPS.pdf>