19h15-19h45 The Odyssey of Image Analysis Boosted by Artificial Intelligence

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Over the past two decades, images have had a significant impact on experimental sciences, specifically in the life sciences. This is where modern microscopes collect spatial, spectral, and temporal information, providing an increasing number of multidimensional images to be quantified by digital image analysis.

The image analysis translates the flow of pixels into relevant information based on a panel of methods and software tools. In practice, this involves extracting visual elements, segmenting regions of interest, detecting objects, or tracking them over time. Image analysis systems have been usually developed from on problem modeling, enabling the creation of effective programs able to solve specific tasks.

More recently, artificial intelligence has allowed to approach image analysis through deep learning, driven by learning directly from the data itself, without the need for explicit problem modeling. The adaptability of deep learning to data opens up new avenues for applications in imaging. However, it is crucial to note that the successes of deep learning should not overshadow the risks of instability and the strong dependence on data. The straightforward implementation of data-driven methods does not exempt from the scientific rigor in building representative, well-designed, and unbiased training datasets.