

# Analysing edge-on galaxies with deep learning

Wednesday, 25 September 2024 16:30 (15 minutes)

The advent of large astronomical surveys, such as Euclid, will offer unprecedented insights into the statistical properties of galaxies. However, the large amounts of data that will be generated by these surveys call for the application of machine learning methods. For this purpose, we trained the YOLOv5 algorithm to accurately detect spiral, edge-on galaxies in astronomical images and the SCSS-Net neural network to generate segmentation masks, so that the detected galaxies can be used for any further analysis. This algorithm was applied on current astronomical images; however, its real power lies in its applicability to data from future surveys, where it can lead to new discoveries. We will also present one of our future goals, which is the study of the galactic warps: a well-known distortion of the galactic discs occurring in most spiral galaxies, including the Milky Way. Despite the fact that we know hundreds of warped galaxies of different shapes and sizes, it is still not clear how the warp is created. We will show how our algorithm can yield a deeper statistical analysis that will enable us to make connections between the different warps, understand their environmental dependencies, and thus contribute to understanding how this feature forms and what role it plays in the galactic evolution.

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**Session Classification:** Cosmology