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Deep learning algorithms for morphological classification of galaxies

Friday, December 1, 2023 11:15 AM (1 hour)

Galaxies exhibit a wide variety of morphologies which are strongly related to their star formation histories and formation channels. Having large samples of morphologically classified galaxies is fundamental to understand their evolution. In this talk, I will review my research related to the application of deep learning algorithms for morphological classification of galaxies. This technique is extremely successful and has resulted in the release of morphological catalogues for important surveys such as SDSS, MaNGA or Dark Energy Survey. I will describe the methodology, based on supervised learning and convolutional neural networks (CNN). The main disadvantage of such approach is the need of large labelled training samples, which we overcome by applying transfer learning or by 'emulating'the faint galaxy population. I will also show current challenges for the classification of galaxy images with CNNs, such as the detection, classification and segmentation of low surface brightness features, which will be of great relevance for surveys such as HSC-SSP or ARRAKIHS, and our current plans for addressing them properly.

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