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# Deep learning searching for cluster galaxies from multi-band imaging and extensive spectroscopy

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With the upcoming of next-generation large and data-intensive surveys, the development of methods able to automatically extract information from the vast amount of data has exponentially grown up in the last decade. In this work, we explore the classification capabilities of Convolutional Neural Networks to identify galaxy Cluster Members, by disentangling them from foreground and background sources directly from Hubble Space Telescope images by exploiting extensive spectroscopic surveys (CLASH-VLT and MUSE), without any additional photometric information. We train the neural network with squared multi-band thumbnails extracted from HST ACS and WFC3 imaging by combining 15 clusters at redshift 0.2<⊠<0.6, with ~3800 spectroscopic redshifts in total. We find that a typical purity and completeness of ~90% in identifying Cluster Members can be achieved by feeding the networks only with HST image cut-outs, avoiding the complexity of photometric measurements in cluster fields.

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