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DEEP LEARNING FOR STAR CLUSTER DETECTION IN GALAXIES

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One of the most important objects when studying galaxies are stellar clusters. The stars in a cluster are of a similar age, composition, and distance, thereby making them exceptionally suitable to learn about a galaxy's star formation and dynamic history. As important as they are, locating them presents difficulties: so far, there are no adequate automated cluster detection methods and methods using experts or volunteers are employed. For this reason, we seek to employ modern machine learning algorithms, specifically a convolutional neural network (CNN), to automate the detection of clusters. Such a method would allow for repeated and fast detections of clusters in images. To train the model we use a large dataset of synthetic clusters covering a variety of ages, masses, and shapes. We project these clusters onto real observations from the Panchromatic Hubble Andromeda Treasury. We evaluate the performance of our model using various tests involving both synthetic and natural clusters. We compare these results to existing catalogues. We will also draw attention to the difference in performance by volunteers and our model. The presentation will detail the model, including training and validation, inferences and results from our tests and current challenges, unresolved issues, and the possibility of improvements.