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Using k-Means to identify Coronal Holes on AIA/SDO Images

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Through its magnetic activity, the Sun governs the conditions in Earth's vicinity, creating space weather events, which have drastic effects on our space- and ground-based technology. The identification of the coronal Holes on the Sun as one of the source regions of the solar wind is therefore crucial to achieve predictive capabilities. In this study, we used an unsupervised machine learning method, k-means, to pixel-wise cluster the passband images of the Sun in the wavelenghts 171 Å, 193 Å, and 211 Å. Our results show that the pixel-wise k-means clustering together with systematic pre- and post-processing steps provides compatible results with those from complex methods, such as CNNs. More importantly, our study shows that there is a need for a CH database that a consensus about the CH boundaries are reached by observers independently. This database then can be used as the "ground truth", when using a supervised method or just to evaluate the goodness of the models.

I want to give an oral presentation.

I want to present a poster.

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