

X18a Combining neural networks and galaxy light subtraction for discovering strong lenses in HSC

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Galaxy-scale strong gravitational lenses are valuable objects for a variety of astrophysical and cosmological applications, including studies of the mass structure of galaxies, the properties of dark matter, high-resolution studies of distant sources, and the measurement of cosmological parameters. However, strong lensing galaxies are rare, requiring a chance alignment of a foreground galaxy with a bright background object. As a result, the best datasets for discovering strong lenses are deep, wide-field, multiband imaging surveys that cover a large area of the sky. Therefore, efficient methods are needed to search for strong lenses in these large datasets, such as convolutional neural networks (CNNs). We develop a new supervised neural networks by subtracting the lensing galaxy light from both the training and test datasets. We use the data from Hyper Suprime-Cam Subaru Strategic Program (HSC-SSP) as our training dataset and test dataset. By subtracting the lensing galaxy, the goal is to highlight the lensed source compared to the original imaging data. We also apply the subtraction to non-lenses in order to make the conditions the same. Here, We present the detail of our light subtraction procedure and our networks, and compare their results.