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A Pipeline for Detection of Sources from Radio Observation Images Based On Deep Learning Framework

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Upcoming radio sky survey projects, such as the Square Kilometer Array (SKA), are anticipated to collect vast amounts of observational data, encompassing the spatial and frequency distribution of various celestial objects. The detection and segmentation of these celestial objects from the observational data are crucial for further scientific investigation. However, directly detecting celestial objects from the observation data poses a challenge, particularly considering the high spatial resolution and multitude of channels involved. In this study, we propose a pipeline designed to detect and segment celestial objects directly from the observation data. The pipeline initially locates the distribution of celestial objects in two spatial coordinates and one frequency coordinate with a modified Faster-RCNN, and subsequently segments the data cube into celestial object distributions using the Gaussian fitting method. We evaluate the effectiveness of our pipeline using both simulated and real observation data, and the results demonstrate the efficacy of our method in directly detecting targets from the observation data.

keywords

Deep Learning, Neural Network, Imaging

In-person or online?

unsure

Career level

ECR

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