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Automated Detection of Plages in Hand-drawn Suncharts from the Kodaikanal Solar Observatory Using Machine Learning Technique

The Kodaikanal Solar Observatory (KoSO), one of the oldest solar observatories, possesses hand-drawn suncharts that depict various solar features such as plages, filaments, sunspots, and prominences, each marked with distinct colors. These suncharts are valuable for addressing the data gap in the Ca II K dataset of KoSO from 1980 to 2007, which resulted from plate damage and changes in observational conditions after 1980, leading to a decline in data quality. However, hand-drawn suncharts, available since 1904, provide detailed representations of solar features on Stonyhurst grids. These charts will help fill gaps in the Ca II K data and contribute to the reconstruction of pseudomagnetograms by integrating information on plages and filaments. Currently, we have 6k x 6k scanned images of these suncharts, and we have applied a CNN-based machine learning model to calculate the center, radius, and P-angle from 1904 to 2007. To train the CNN model for identifying plages on the suncharts, we created a training dataset by detecting plages in Ca II K images. This approach will enhance the automatic identification of solar features and assist in analysing historical solar data.

Contribution Type

Theme

Solar Magnetism over Long-Time Scales

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