

[구SS-03] SVM을 이용한 지구에 영향을 미치는 Halo CME 예보

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In this study we apply Support Vector Machine (SVM) to the prediction of geo-effective halo coronal mass ejections (CMEs). The SVM, which is one of machine learning algorithms, is used for the purpose of classification and regression analysis. We use halo and partial halo CMEs from January 1996 to April 2010 in the SOHO/LASCO CME Catalog for training and prediction. And we also use their associated X-ray flare classes to identify front-side halo CMEs (stronger than B1 class), and the Dst index to determine geo-effective halo CMEs (stronger than -50 nT). The combinations of the speed and the angular width of CMEs, and their associated X-ray classes are used for input features of the SVM. We make an attempt to find the best model by using cross-validation which is processed by changing kernel functions of the SVM and their parameters. As a result we obtain statistical parameters for the best model by using the speed of CME and its associated X-ray flare class as input features of the SVM: Accuracy=0.66, PODy=0.76, PODn=0.49, FAR=0.72, Bias=1.06, CSI=0.59, TSS=0.25. The performance of the statistical parameters by applying the SVM is much better than those from the simple classifications based on constant classifiers.

[구SS-04] Chromospheric Sunspot Oscillations in H-alpha and Ca II 8542A

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We study chromospheric oscillations including umbral flashes and running penumbral waves in a sunspot using scanning spectroscopy in H-alpha and Ca II 8542A, with the Fast Imaging Solar Spectrograph (FISS) at the 1.6 meter New Solar Telescope at Big Bear Solar Observatory. A bisector method is applied to spectral observations to construct chromospheric Doppler velocity maps. Temporal sequence analysis of these shows enhanced high-frequency oscillations inside the sunspot umbra in both lines. Their peak frequency gradually decreases outward from the umbra. The oscillation power is found to be associated with magnetic-field strength and inclination, with different relationships in different frequency bands.