The SDO flare detective

Paolo C. Grigis

Smithsonian Astrophysical Observatory

Alisdair Davey

SAO

Petrus Martens

SAO

Yingna Su

SAO

Paola Testa

SAO

Abstract.   We present the flare detective, a software module to automatically detect and characterize solar flares observed with the Atmospheric Imaging Assembly (AIA) onboard the Solar Dynamics Observatory (SDO). The flare detective works in two steps. First, flares will be detected in EUV images by analysing lightcurves in macropixels. At this time, only basic quantities such as time intervals, positions, and peak fluxes will be determined. This will allow the module to keep up with the extremely large size of the incoming data stream and provide near real-time information for space weather monitoring. Second, the flare detective will be run again on the subset of images around the time intervals where a flare has been already detected, where more sophisticated (and slower) processing will be performed to better characterize the flare and provide physically important parameters such as temperatures and emission measures, projected areas and lightcurves in different channels. The events detected will be made available to the Heliophysics Knowledgebase (HEK) and also as a flare list in text format accessible on the web. This module is part of a larger effort to detect and track solar features and events that is optimized to run on very large datasets such as the ones provided by SDO.