

Autonomous Detection of Coronal Mass Ejections (CME) in Heliospheric Imager (HI) Data
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Coronal Mass Ejections (CME) are important to study in terms of geomagnetic storms that affect earth's atmosphere. Improvements to space weather forecasting can be made with the autonomous detection of CMEs. The autonomous detection of coronal mass ejections has been developed for Solar Mass Ejection Imager (SMEI) data with a tool called Automatic Interplanetary Coronal Mass Ejection Detection (AICMED). The leading edge of the CME is then detected and its information fed into a model called the Tappin-Howard model, which creates a 3D reconstruction of the CME. However, SMEI data are very noisy, which makes it difficult to detect the leading edge of the CME. The detection of a CME and extracting its leading edge was successful for SMEI data, however, the leading edge output information was not accurate enough to get the 3D reconstruction model working. This calls for alternative data to be used. Heliospheric Imager data (specifically HI-2 data) from NASA's SOHO mission is an alternative for SMEI data. HI data are much less noisy than SMEI data, but could have limitations due to motion blur which are being explored. The main goal for the project is to adapt the AICMED tool for SMEI data to the HI data. This can be done changing the coordinate system to fit HI data, which does not have the sun in its field of view like SMEI data, and adapting parameters in the detection tool to extract the CME and its leading edge. The ultimate goal of the project is to detect a CME, its leading edge and feed the output into the Tappin-Howard model for a successful reconstruction of the CME.