

Advances in the Meteor Image Processing Chain using Fast Algorithms, Deep Learning, and Empirical Fitting

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The imagery pipeline for both video meteor detection and track analysis has evolved to encompass several new algorithms which improve the efficiency and performance of various links in the processing chain. With the advent of larger pixel count digital sensors, meteor image processing has needed to keep up with the computational load by not only using higher end processors, but developing faster thresholding, clustering, and tracking algorithms for detection. Machine learning methods employing both recurrent and convolutional neural networks has helped remove the human-in-loop false alarm mitigation step inherent in many video meteor networks. Matched filtering algorithms have been shown to refine the measurement positional accuracy of propagating meteor tracks in post-detection analysis. And lastly, multi-parameter trajectory fitting using an empirically based propagation model, shows promise for a more robust atmospheric track estimation technique.