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Tamas Budavari
Johns Hopkins University

"Multi-Epoch Source Detection"

Observational astronomy in the time-domain era faces several new challenges. One of them is the efficient use of multiple observations. The work presented here is focusing on faint sources at the detection threshold, and seeks to find an incremental strategy for separating real objects from artifacts in ongoing surveys, where one does not have all the observations readily available. We study the detection probability of sources in single exposures and stacks in comparison with what is achievable by matching noisy catalogs to find their results to agree well in the interesting regime. Given a set of measurements, we then discriminate real sources from noise peaks using Bayesian hypothesis testing. Including the astrometric measurements boosts the evidence for the faintest sources, which makes the discrimination easier.