Novel Measures for Rare Transients

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Abstract

Data volumes in astronomy have been growing rapidly. Various projects and methodologies are starting to deal with this. As we cross-match and correlate datasets, the number of parameters per object—in other words dimensions we need to deal with—is also growing. This leads to more interesting issues as many values are missing, and many parameters are non-homogeneously redundant. One needs to tease apart clusters in this space which represent different physical properties, and hence phenomena. We describe measures that help to do that for transients from the Catalina Realtime Transient Survey, and project it to near future surveys. The measures are based partly on domain knowledge and are incorporated into statistical and machine learning techniques. We also describe the discriminating role of appropriate follow-up observations in near-real-time classification of transients. In particular such novel measures will help us find relatively rare transients.