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Prioritising Follow-up for Transient Surveys in the New Era of Time-Domain Astronomy

Wednesday, November 29, 2023 3:00 PM (15 minutes)

New large-scale astronomical surveys such as the Vera Rubin Observatory's Legacy Survey of Space and Time (LSST) have the potential to revolutionize transient astronomy, providing opportunities to discover entirely new classes of transients while also enabling a deeper understanding of known supernovae. LSST is expected to observe over 10 million transient alerts every night, over an order of magnitude more than any preceding survey. In this talk, I'll discuss the issue that with such large data volumes, the astronomical community will struggle to prioritize which transients - rare, interesting, or young - should be followed up. I address three major challenges: (1) automating real-time classification of transients, (2) automating serendipity by identifying the likelihood of a transient being interesting and anomalous, and (3) identifying the epoch time in order to observe transients early to understand their central engine and progenitor systems. I present machine learning and Bayesian methods of automating real-time classification, anomaly detection, and predicting epoch times of transients. Our ability to classify events and identify anomalies improves over the lifetime of the light curves.

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