# Autonomous real-time science-driven follow-up in the era of LSST

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The deluge of data from time-domain surveys is rendering traditional human-guided data collection and inference techniques impractical. In order to maximize the science potential of surveys and follow-up resources, autonomous systems reacting in real-time to maximize diverse science goals are needed. We designate the class of systems that strategize and coordinate value-driven follow-up in real-time ORACLEs (Object Recommender for Augmentation and Coordinating Liaison Engine) and demonstrate key underlying principles in a prototype ORACLE called Recommender Engine For Intelligent Transient Tracking (REFITT). REFITT is an autonomous real-time decision support and resource allocation system that ingests live alerts from surveys and value-added inputs from data brokers, and using machine-learning based predictive modeling for sparse multi-channel time-series strategizes, optimal follow-up using value-based metrics. We validate the performance of REFITT given simulated core-collapse supernova light-curves from the Rubin Observatory Legacy Survey of Space and Time, and value-added inputs from data brokers. We suggest that ORACLEs like REFITT are an essential component in the broader software infrastructure necessary to support survey science.