

STATISTICAL ANALYSIS AND DATA MINING

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Semi - supervised Eigenbasis novelty detection

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Abstract

We present a semi - supervised online method for novelty detection and evaluate its performance for radio astronomy time series data. Our approach uses sparse, adaptive eigenbases to combine (1) prior knowledge about uninteresting signals with (2) online estimation of the current data properties to enable highly sensitive and precise detection of novel signals. We apply Semi - Supervised Eigenbasis Novelty Detection (SEND) to the problem of detecting *fast transient* radio anomalies and compare it to current alternative algorithms. Tests based on observations from the Parkes Multibeam Survey show both effective detection of interesting rare events and robustness to known false alarm anomalies. © 2012 Wiley Periodicals, Inc. Statistical Analysis and Data Mining 6: 195–204, 2013

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