Anomalous Event Detection for Internet End-to-end Performance Measurements

Abstract

We describe and compare the use of several different algorithms that we have implemented to detect persistent anomalous events in real end-to-end Internet performance measurements. The measurements are based on active probes running on 40 production network paths with bottlenecks varying from 0.5Mbits/s to 1000Mbit/s. For well behaved data (no missed measurements and no very large outliers) with small seasonal changes most algorithms identify similar events. We compare the algorithms' robustness with respect to false positives and missed events especially when there are large seasonal effects in the data. We also discuss the applicability of the algorithms in terms of their intuitiveness, their speed of execution as implemented, and areas of applicability.

Keywords

*A*nomalous event detection, forecasting, network monitoring, network performance, performance analysis, persistent anomalies, trouble shooting, Kolmogorov-Smirnov, Holt-Winters, Principal Component Analysis, plateau algorithm.

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