

Detection of Anomalous Series Within a Large Collection of Streaming Time Series Data.

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Abstract

Due to rapid growth in hardware technology, it has become increasingly common for many applications to use multiple sensors in large quantities to monitor different locations, living beings, or objects in real time. These applications can generate millions of individual time series simultaneously. In this paper, we propose an algorithm to find anomalous time series within a large collection of streaming time series data. The proposed algorithm is based on the assumption that an anomaly displays a significant deviation from the model of the typical behavior of a given system. The proposed framework is twofold: (1) building a model of a system's typical behaviour; and (2) testing newly arrived data using the model of the typical behaviour. We combine the ideas from feature-based representation of time series and extreme value theory for the model building process. The effectiveness of the proposed framework for anomaly detection in streaming time series data is evaluated using both synthetic and real data. We show that the proposed algorithm can work well both in the presence of concept drift and in the presence of multi-modal typical classes.