A Dynamic Ensemble Learning Approach for Online Anomaly Detection in Alibaba Datacenters

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Abstract : Anomaly detection is a first and imperative step needed to respond to unexpected problems and to assure high performance and security in large data center management. This paper presents an online anomaly detection system through an innovative approach of ensemble machine learning and adaptive differentiation algorithms, and applies them to performance data collected from a continuous monitoring system for multi-tier web applications running in Alibaba data centers. We evaluate the effectiveness and efficiency of this algorithm with production traffic data and compare with the traditional anomaly detection approaches such as a static threshold and other deviation-based detection techniques. The experiment results show that our algorithm correctly identifies the unexpected performance variances of any running application, with an acceptable false positive rate. This proposed approach has already been deployed in real-time production environments to enhance the efficiency and stability in daily data center operations.
Keywords : Alibaba data centers, anomaly detection, big data computation, dynamic ensemble learning
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