


Chapter 15

Performance Analysis of MCOD Algorithm With Varying Parameters

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ABSTRACT

Outlier detection has become one of the prominent and most needed technologies these days. Outliers can be anything in our daily life like credit card fraud, intrusion in a network, aberrant condition detection in condition monitoring data. There are numerous methodologies to detect outliers. In the past few years many tools have come up in the outlier detection in data streams. In this chapter, the authors discuss the tool MOA (massive online analysis) to detect anomalies and the best performing algorithm amongst the prescribed algorithms of MOA. The authors elaborately discuss that MCODE (micro-cluster-based algorithm) is one of the best in the prescribed algorithms of the MOA (massive online analysis) tool which outperforms all other algorithms. In this paper, the authors will deeply discuss the performance of MCODE algorithm. The authors will also discuss which factor of MCODE separates its performance from others and also what the different parameters that influence the performance of MCODE are.

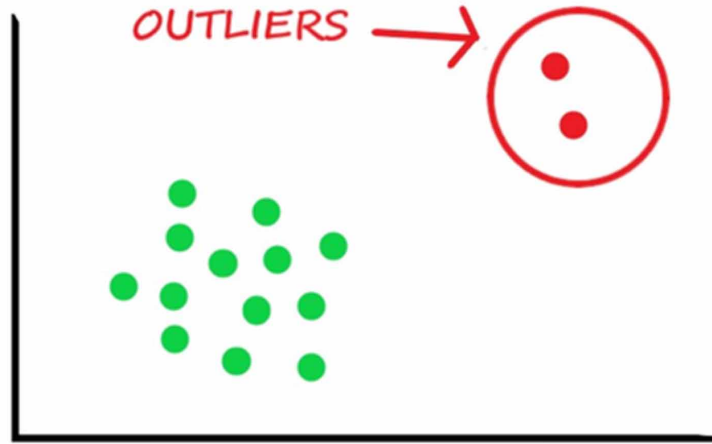
INTRODUCTION

What is an Outlier?

An outlier is a data point that differs from significantly different from normal observations. It can be so because of the change in the measurement or because of the error in the experiments conducted. But an outlier can give difficult problems in any statistical analysis.

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Figure 1. Example of an outlier



Not all outliers are the same. Some cause serious outbursts in the data, some have very strong influence on data and some are actually valid and significant values. For example take animal health monitoring data, there might be a situation where we observe that certain values are far away from the normal values, but actually the animal must be very healthy. So, there might be another reason that it generated that type of data or its usual in this case.

Therefore, we need a strong monitoring device which actually detects the outliers based on the pattern. Now, let us see how many types of Outliers are there.

There are three basic classification of outliers

1. Global Outliers
2. Contextual Outliers
3. Collective Outliers

Global Outliers: An observation or a reading or a data point can be considered as a Global Outlier when it is found far away from the data set entirely.

Contextual Outliers: Any data point is called a Contextual outlier when it deviates from the rest of the normal data points. Sometimes these Contextual outliers can be inliers also based on the context. Usually time series data has Context outliers.

Collective Outliers: If a set of data points are deviating as a whole from the normal data points in the data set, then such data points are called as Collective Outliers. But, within themselves they are not called as Outliers or anomalies to each other.

There are several approaches to detect outliers like Machine learning Algorithms, Distance based Clustering, Statistical, Artificial Neural Networks etc. (Santoyo, 2017)

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