Discovering Local Outliers using Dynamic Minimum Spanning Tree with Self-Detection of Best Number of Clusters

International Journal of Computer Applications © 2010 by IJCA Journal

Number 7 - Article 6

Year of Publication: 2010

Authors:

S. John Peter

Abstract

Detecting outliers in database (as unusual objects) using Clustering and Distance-based approach is a big desire. Minimum spanning tree based clustering algorithm is capable of detecting clusters with irregular boundaries. In this paper we propose a new algorithm to detect outliers based on minimum spanning tree clustering and distance-based approach. Outlier detection is an extremely important task in a wide variety of application. The algorithm partition the dataset into optimal number of clusters. Small clusters are then determined and considered as outliers. The rest of the outliers (if any) are then detected in the clusters using Distance-based method. The algorithm uses a new cluster validation criterion based on the geometric property of data partition of the dataset in order to find the proper number of clusters. The algorithm works in two phases. The first phase of the algorithm creates optimal number of clusters, where as the second phase of the algorithm detect outliers in the clusters. The key
Discovering Local Outliers using Dynamic Minimum Spanning Tree with Self-Detection of Best Number of Clusters

Feature of our approach is it combines the best features of Distance-based and Clustering-based outlier detection to find noise-free/error-free clusters for a given dataset without using any input parameters.

Reference

- F. Angiulli, and C. Pizzuti, “Outlier Mining in Large High-Dimensional Data sets”, IEEE Transactions on Knowledge and Data Engineering, 17(2): 203-215, 2005
- A. Hardy, “On the number of clusters”, Computational Statistics and Data Analysis, 23,
Discovering Local Outliers using Dynamic Minimum Spanning Tree with Self-Detection of Best Number of Clusters

- E.Knorr and R.Ng, “Algorithms for Mining Distance-based Outliers in Large Data sets”, Proc.the 24th International Conference on Very Large Databases(VLDB),pp.392-403, 1998.

3 / 5
Discovering Local Outliers using Dynamic Minimum Spanning Tree with Self-Detection of Best Number of Clusters

- Stefan Wuchty and Peter F. Stadler, “Centers of Complex Networks”, 2006

Index Terms

Computer Science
Information Retrieval

Key words
Euclidean minimum spanning tree
Subtree
Clustering

Eccentricity
Cluster validity

Cluster Separation

Small Clusters

Outliers