Effect of Dynamic Time Warping using different Distance Measures on Time Series Classification

Abstract

Time series classification involves classifying the time series according to the labels given in the training dataset. Time series data has features that are not completely independent of each other. Hence using algorithms such as Naïve Bayes or Support Vector Machines will not yield satisfying classification results due to the inherent assumption of feature independence of these algorithms. In such cases, similarity measures to find the similarity between the time series for classification can be opted. But there is an abundance of similarity measures available for finding the distance between two points. As the discussion is about time series data here, not all similarity measures can be applied to the data. One of the widely used distance measures, Euclidean distance, suffers when there are distortions in the time axis. Hence, this paper discusses about another widely used similarity measure called as Dynamic Time Warping for time series classification. Dynamic Time Warping itself uses a distance measure as one of the steps in the algorithm. This paper aims at comparing the various distance measures used for Dynamic Time Warping. The result obtained by the Dynamic Time Warping is provided to the K-Nearest Neighbor Classifier to achieve Time Series Classification.
Effect of Dynamic Time Warping using different Distance Measures on Time Series Classification

References


Index Terms

Computer Science

Information Sciences

Keywords

Dynamic Time Warping, Euclidean Distance, Normalized Euclidean Distance, Manhattan Distance, Canberra Distance