國立中山大學跨領域及數據科學研究中心
國立中山大學應用數學系
學術演講

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講　題：Tree-based Methods for Clustering Time Series Using Domain-Relevant Attributes

時　間：2019/04/10（星期三）14:10 ~ 15:00

地　點：理學院四樓理 SC 4009-1 室

茶　會：15:00 於理 SC 4010 室 (系辦公室)

摘 要

We propose a set of two new methods for clustering time series that captures temporal information (trend, seasonality and autocorrelation) and domain-relevant cross-sectional attributes. The methods are based on model-based partitioning (MOB) trees and can be used as an automated yet transparent tool for clustering a large collection of time series. We overcome the challenge of using common time series models within the MOB framework by utilizing computationally advantages ordinary least squares (OLS) approach. We propose and compare two methods. The single-step method clusters series using trend, seasonality, time series lags and domain-relevant cross-sectional attributes, using a single linear regression model. The two- step method first clusters by trend, seasonality and domain-relevant cross-sectional attributes, and then further clusters the residuals series by autocorrelation and the domain-relevant cross-sectional attributes. Both methods produce clusters that are interpretable by domain experts. We illustrate the usefulness of the proposed clustering approach by considering one-step-ahead forecasting. We present empirical results of comparing our approach to forecasting each series using an Auto Regressive Integrated Moving Average (ARIMA) model applied to a large set of Wikipedia article pageviews time series. Our results show that the tree-based approach produces forecasts that are practically on par with ARIMA models, yet are significantly faster and more efficient, thereby suitable for scaling to large

collections of time-series. Moreover, our method produces simple parametric forecasting models for interpretable clusters of time series, whereas ARIMA cannot provide such interpretability.

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