

网络、通信、安全

应用乘积季节ARIMA模型的话务量预测及结果分析

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摘要 话务量预测功能对于电信网络规划建设、网络优化意义重大。深入研究了某省某移动网络运营商的多年的话务量数据, 利用自相关函数对其周期性和趋势性方面的规律进行了探测, 并在此基础上提出应用乘积季节ARIMA模型进行建模和预测的方案。进行了2008年7月到12月的全省及各地区月日均话务量的预测, 并与网络实际运营结果进行了比较。所应用方法的一步预测值平均绝对百分比误差MAPE为1.382%, 6步预测的MAPE值均在6%以内, 是精确度很高的预测; 对预测误差较大的某地区进行了原因分析, 证明了模型的正确性, 并为实际预测应用中经常遇到的预测误差偏大的问题提供了一种有效的分析思路和方法。

关键词 [自回归整合滑动平均 \(ARIMA\)](#) [乘积季节ARIMA](#) [自相关函数](#) [相关系数](#) [话务量](#)

分类号

Research on traffic prediction and result analysis of using multiplicative seasonal autoregressive integrated moving average

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Abstract

Traffic prediction is of significant importance for telecommunication network construction plan and network optimization. The traffic series for a province of a mobile network operator is studied and the regularities about trend and season are explored using autocorrelation function. Based on the characteristics exhibited in the traffic series, multiplicative seasonal Autoregressive Integrated Moving Average model (ARIMA) is employed to make traffic series prediction. Daily traffic per month for the province and for every region from July to December in 2008 is forecasted, and it is compared with the actual operation data. The Mean Absolute Percentage Error (MAPE) for one-step ahead prediction is 1.382%, and MAPE for the 6 steps are all less than 6%. The prediction result is of high precision. Furthermore, the cause for the large prediction error in 2 regions is analyzed, and the appropriateness of the model is testified on the opposite aspect. This paper also provides an effective method by using correlation coefficients for analyzing the reason for large prediction errors which often happen in time series prediction applications.

Key words [Autoregressive Integrated Moving Average \(ARIMA\)](#) [multiplicative seasonal Autoregressive Integrated Moving Average](#) [autocorrelation function](#) [correlation coefficient](#) [traffic](#)

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