

عنوان مقاله:

Multivariate Time Series Prediction Considering Intra-Time-Series and Inter-Time-Series Dependencies

محل انتشار:

مجله پیشرفت در تحقیقات کامپیوتری، دوره 12، شماره 3 (سال: 1400)

تعداد صفحات اصل مقاله: 12

نویسندگان:

Parinaz Eskandarian - *Department of Computer Engineering, Urmia Branch, Islamic Azad University, Urmia, Iran*

Jamshid Bagherzadeh - *Department of Computer Engineering, Urmia Branch, Islamic Azad University, Urmia, Iran*

Habibollah Pirnejad - *Patient Safety Research Center, Clinical Research Institute, Urmia University of Medical Sciences, Urmia, Iran*

Zahra Niazkhani - *Nephrology and Kidney Transplant Research Center, Clinical Research Institute, Urmia University of Medical Sciences, Urmia, Iran*

خلاصه مقاله:

A few artificial neural networks have been proposed so far for multivariate time series prediction and they used simple general-purpose neural networks. Therefore, they cannot achieve high prediction accuracy. In this paper, we propose an artificial neural network called DBMTSP (Dependency Based Multivariate Time Series Prediction) to predict the next element of a time series in the multivariate case. Compared to the existing methods, DBMTSP considers both intra-time-series dependencies and inter-time-series dependencies efficiently to achieve more accurate predictions. We propose a hierarchical encoder in DBMTSP to discover inter-time-series dependencies. The proposed hierarchical encoder is able to encode secondary time series into a single parameter that represents dependencies that exist between the main time series and the secondary time series. The hierarchical encoder has a scalable design such that it can accept a large number of secondary time-series. We have trained DBMTSP using ۳۲۷۶۰ data matrices. We evaluated DBMTSP using ۸۱۹۰ test data matrices. Our evaluations show that DBMTSP surpasses the existing methods in term of prediction accuracy.

کلمات کلیدی:

Time series, multivariate, Prediction, Artificial Neural Network

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1419772>

